APRIL 25, 1955

NEWS ISSUE

Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION

19 Nations Come to Study Atom. . . . . Page 30

All-Electric Home Seen at Hand . . . . . Page 16

German Museum Shows Industry Progress. . .

E S POWER
313 N 1 ST
ANN ARBOR MICH
UNIVERSITY MICROFILMS IN

TEXAS POWER & LIGHT was cited for contributions to industrial and agricultural development in its service area. Investigation of untapped natural resources led to new industry—typified by the new Alcoa reduction plant at Rockdale. Opening day ceremonies were attended by (L to R) J. D. Harper, works manager; Congressman Robert Poage; W. W. Lynch, President, Texas P&L; Governor Allan Shivers; T. D. Jolly, Alcoa Vice President; Lee E. Cook, Texas P&L Vice President; A. P. Hall, Alcoa Vice President.

PENNSYLVANIA POWER & LIGHT received recognition for outstanding contributions in aiding progress in all phases of sales promotion and business development. Highly successful co-ordination of the activities of manufacturers, distributors, and dealers of electrical farm equipment and machinery, plus the utilization of national publications, helped accelerate the application of electricity in a manner conducive to improving the economic welfare of customers and the entire Service Area.

FOUR CITATIONS SIGNED, Harold Quinton, President of the Edison Electric Institute and Southern California Edison Company (left) looks ahead to final award with Colonel H. S. Bennion, Managing Director of E. E. I. The Coffin Award for outstanding operating and community achievement will be presented on June 14.

OUTSTANDING INDUSTRY, COMMUNITY PROGRAMS CITED

as four electric utilities get Coffin Award nominations

"Telling the story of the American competitive system," "organization teamwork," "business development," "industrial and agricultural development."

These are the stories that are back of the nominations by E.E.I. of Arizona Public Service, Cleveland Electric Illuminating, Pennsylvania P&L, and Texas P&L for the highly prized Coffin Award for 1954. To each has gone a citation from E. E. I. commemorating these outstanding achievements. And to each, General Electric Company, donor of the award, extends its heartiest congratulations for a job well done. General Electric Company, Schenectady 5, N. Y. 301-293

MORE POWER TO AMERICA

GENERAL ELECTRIC

ARIZONA PUBLIC SERVICE was designated for a successful community approach to helping preserve the American democratic ideals of personal liberty and freedom by telling the story of the American competitive system in a way that won community-wide acceptance and praise.

THE CLEVELAND ELECTRIC ILLUMINATING was cited for successful organization teamwork techniques that led to cost reductions, improved public relations. Above, Mayor A. J. Celebrezze and C. E. I. Vice President R. M. Besse scan program at premiere of utility's movie, "Land of Promise."

Electrical World

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COMING NEXT WEEK—Considerable confusion prevails in present-day design of grounding systems for power plants and substations. Stephen J. Schwarz, Sverdrup & Parcel, attacks this problem in an article designed to show that many of today's practices could be simplified and costs reduced. In line with this thinking will be a series of articles of a new all-steel grounding system at Pennsylvania P&L's 220-kv Hosensack Substation.

Published for 81 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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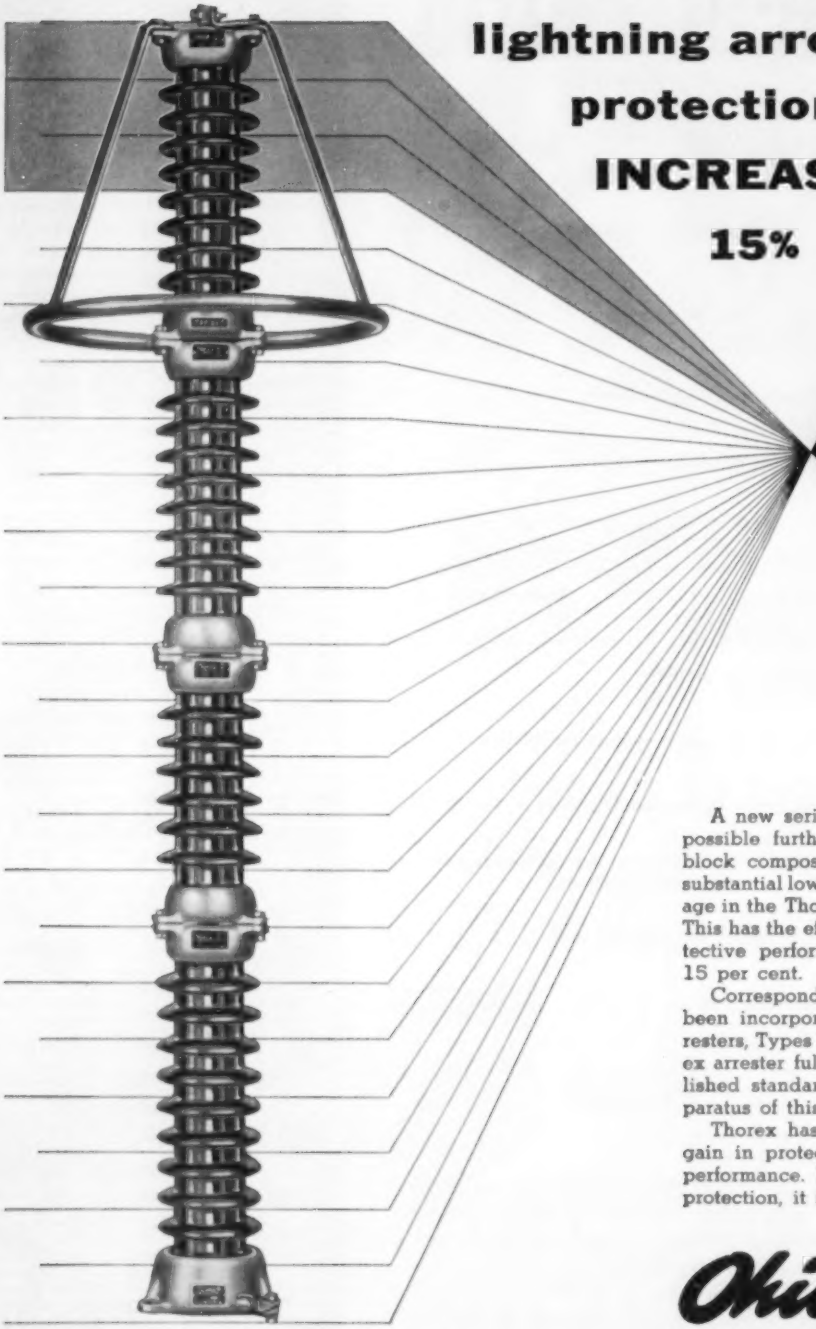

Thorex lightning arrester protection INCREASED 15%

A new series gap structure, making possible further refinements in valve block composition, has resulted in a substantial lowering of IR discharge voltage in the Thorex GP lightning arrester. This has the effect of increasing its protective performance by approximately 15 per cent.

Corresponding improvments have been incorporated in other Thorex arresters, Types MP and MPR. Every Thorex arrester fully complies with all published standards for Station Grade apparatus of this type.

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EDITORIALS

Utilities Should Be Spared Relocation Costs

Rockland Light & Power Co presents a fair example of what happens to an electric utility when a superhighway or two comes slashing through its system area (EW, Feb. 7, p. 62). Also the Rockland situation indicates the way in which utility relocation costs can be handled more equitably.

The New York Thruway, a real super, was built through the heart of the Rockland L&P system in the vicinity of Nyack, N. Y. Added to that, the Palisades Parkway intersects the system from another angle.

Electric utility relocation costs within the Rockland system ran in the neighborhood of $1 million for the two superhighways. Rockland's total investment in transmission and distribution plant is around $18 million. Thus if the utility had picked up the whole tab, it would have amounted to some 5% of its total T&D investment. It is fairly obvious that a rate increase would have been in order.

Fortunately the New York statute creating the Thruway Authority provided that the Authority bear most of the expenses of utility relocation. That kept Rockland L&P customers from being penalized with higher rates for relocation costs. The electric company still had to bear the relocation costs for the Palisades Parkway, but these were but a small part of the total $1 million costs.

If federal highway legislation now before Congress is enacted into law, electric utilities face an annual expense for relocation of facilities of roughly $20 million a year or $200 million during the ten year program. What's more, this burden won't be distributed equally within the industry but will fall only on those utilities that happen to be in the path of a national highway network or in the way of other road improvements.

Electric utilities, both publicly and privately owned, have joined with other utilities in urging that the federal government help bear the burden of relocating facilities (EW, April 11, p 16). They are merely asking that the government make some arrangement comparable to that of the New York Thruway Authority.

This, it is generally agreed, is a much more equitable way of handling these expenses than shifting them to the utility customer.

Never Underestimate the Industry

Government officials, some with long experience in business and industry, openly expressed surprise and satisfaction at the response which the electric utility industry has given to the power reactor development program.

Within the eight months since Congress opened the way for private enterprise to participate in the nuclear power development program, some 25 electric companies have come up with proposals to build or help build some 800,000 kw of nuclear-fueled generating capacity.

Atomic Energy Commission Chairman Lewis L. Strauss calls the response "very gratifying." "The significant point is," said Strauss, "the extent to which the proposers are prepared to risk their own money."

Sen Clinton Anderson, chairman of the Congressional Atomic Energy Committee, calls it "a good start." He promises to "support every effort (AEC) makes to push the reactor program in this country."

Even those who worked hardest to get the law changed last summer did not anticipate this kind of enthusiasm and these firm proposals from the electric industry. AEC certainly did not although it fought a long and tough battle to bring industry into the development program.

At one point the Senate approved an amendment which would have put the federal government deep in the atomic power business, but this was later deleted by the House members of the Conference Committee. Now with the industry showing its very best colors, it would be difficult to gain support for such an amendment.

Much of the credit for the proposals that have come in must, of course, go to the utility groups which have sponsored them. But electrical equipment manufacturers also are to be commended for rising to the occasion with plans, designs, and estimates that have enabled the utilities to go forward into these untried waters.

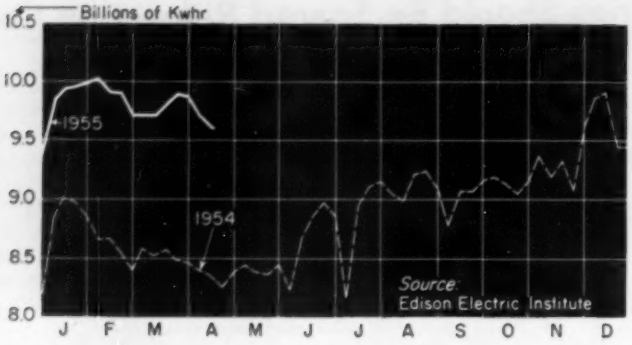
The Same Old Story

Some 20 years ago proponents of federal power won over too many Americans by publicizing hydro power as "cheap power." To many average citizens this sounded reasonable. By substituting water, which was only running down the river anyway, the use of costly coal was eliminated.

Today the same story is being preached. Atomic power will be "cheap power." Again to many average citizens this sounds reasonable. If a utility can use 1 lb of uranium to replace 10,000 lb or is it 50,000 lb of coal, why can't it cut the selling price of electricity? As one person said, it will be too cheap to meter.

This delusion will persist until the industry gives the public the facts. This means explaining, until the public understands, how small a percentage of an electric bill represents the cost of fuel.

The time to start this education program is now. The longer utilities wait, the more they will have to pay to put the program across, and the more difficult it will be to replace the misconceptions with the facts.



OUTPUT

Week Ended Apr. 16
9,602,000,000 Kwhr
Up 15.1%

Per Cent Change from Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Apr. 16	+15.1	+8.5	+7.4	+18.9	+4.9	+23.3	+4.7	+8.5	+14.3	+19.0
Apr. 9	+14.7	+5.6	+6.1	+17.4	+4.4	+25.0	+6.2	+14.2	+8.8	+20.5
Apr. 2	+15.8	+7.4	+9.2	+17.3	+4.3	+26.9	+8.1	+15.0	+11.5	+16.5

Seasonally Adjusted Index 188.8 Week Ago 188.6 Year Ago 164.6

The Issue's News Highlights . . . United States business plans to spend more for new plants and equipment in 1955 than in any previous year, according to McGraw-Hill's eighth annual business survey . . . To help boost national capacity to 150 million kw by end of 1958, the U. S. is again granting tax write-offs to utilities . . . Changes in the Administration's partnership power policy being initiated within the industry call for local utility financing and power use.

Labor: International Resistance Co and IUE-CIO agree on contract described as first guaranteed annual wage in electrical industry. It provides across-the-board 9¢ an hour increase retroactive to April 1. The 9¢ goes into interest-bearing trust fund which will be basis for providing guaranteed earnings to union in event of layoff . . . Salt River Power District and Salt River Valley Water Users' Association and IBEW-AFL agree on contract providing wage increases of 3¢ to 8¢ an hour retroactive to April 1. Contract is first between two parties since district became operating organization in 1949 . . . Appalachian Electric Power and IBEW sign two-year contract with wage reopening clause after one year providing 3% wage increase retroactive to April 1.

TVA: J. C. Bradford, head of J. C. Bradford & Co investment firm, proposes following scheme to finance future TVA power expansion as means of removing region from political pressures: Establishment of Tennessee Authority for sole purpose of selling revenue bonds for financing future construction within its borders (if desirable it could operate in other states, or states could set up their own authorities). It would lease power properties to TVA for a sum sufficient to pay interest on and amortize bonds. When bonds are retired, properties would be transferred without cost to TVA. Bradford says such bonds today would carry interest of 2¾%.

City of Hagerstown, Md., is still studying Potomac Edison Co's offer to either buy city power plant or divide power business. Potomac Edison extended five proposals. One proposal is for PE to buy city's facilities for about $6 million. Two others involve dividing the present customers between PE and the city and two call for the city to buy wholesale power from PE.

Anniversary: G&W Electric Specialty Co celebrated its 50th anniversary at sales meeting April 19. Company's representatives presented it with a special plaque in commemoration of ". . . a half century of progress and achievement . . ." and ". . . in appreciation of the helpful cooperation unfailingly extended by G&W through the years."

NEWS OF THE INDUSTRY BRIEFLY TOLD

Off the Washington Wire . . . Strong spring rains could speed settlement of lengthy Clark Hill Dam dispute. South Carolina distributors have been taking full 280,000-kw output from dam since last June, partly due to lack of water in their own storage units. If heavy rains raise their reservoirs, they may not be so eager to buy Clark Hill output, and disposal would become a problem . . . FPC has issued 50-year license to Southern California Edison for 10,000-kw hydro project in Fresno County . . . FPC, at request of National Coal Association, is reviewing examiner's ruling favoring import of 100 million cf a day of natural gas from Canada by Montana Power.

Foster Wheeler Corp is ready to build an aqueous homogeneous type breeder reactor for nuclear power plant operation. Cost estimate for 100 Mw plant is $21 million. Order now would result in 1960-1961 operation. Reactor type has been reported by Atomic Energy Commission to have long term possibilities.

Robert S. Stevenson, formerly executive vice president, has been elected president of Allis-Chalmers Manufacturing to succeed W. A. Roberts who died April 12.

Pacific NW: Industrial customers of BPA last week continued on 25% of normal quota of interruptible load with no relief expected within the week . . . Heavy March snowfall has improved earlier poor water prospects for Seattle & Tacoma City Light which had threatened power shortage next fall . . . Pacific P&L & Montana Power are conferring on possible partnership development with federal government of Yellowtail hydroelectric project on Big Horn River . . . Corps of Engineers turned Unit No. 8 of McNary Dam for first time April 18. The 70,000-kw generator was expected to be on line by week's end.

An Electrical World check shows that entire electric industry has contracted for 28 million kw of additional generating capacity for delivery before end of 1958. These additions to the 102 million kw installed at end of 1954 will give country total capacity of 130 million kw by that time. But industry will be ordering more capacity for completion before then. EW estimates country will have 138.1 million kw capability in operation by Dec. 31, 1958. This would leave only 12 million kw to be added if ODM's report (p 9) is put into effect. Electrical manufacturing industry today has published productive capacity of 17.5 million kw annually. By end of 1958 it will be at least 20 million kw.

ABOUT PEOPLE IN THE INDUSTRY

If Northwest utilities don't develop their own power supply and become independent of federal power, they "will be out of business in ten to 15 years," according to Pres Kinsey M. Robinson of Washington Water Power. "Time is coming when all federal power will be going to public agencies through operation of the preference clause," he added. "If you are afraid of 4½ mill hydro, you better get out of the business," he said. He also cited tax losses to government from various public power operations.

AEC has proposed three new regulations to ease way to public to prepare license applications to proceed with atomic energy activities. Chairman Lewis L. Strauss, says "these regulations will open way to all who are interested in engaging in research and development or commercial activities in atomic energy field." The objective of the regulations, he added, is "to minimize government control of competitive enterprise." AEC has established no deadlines for filing applications for licenses.

More News About People page 36

Business Optimism Seen in '55-58

- **Annual McGraw-Hill survey shows 1955 will be record year with 5% bigger capital outlay than in 1954**
- **Rising trend of capital spending may carry far beyond 1955, judging by industry's present plans**
- **Manufacturers plan to devote more of their capital spending to expansion, less to modernization this year**

United States business as a whole plans to spend more for new plants and equipment in 1955 than in any previous year. This is revealed by McGraw-Hill's eighth annual survey of Business' Plans for New Plants and Equipment, just released.

Manufacturing companies plan to increase capital spending 3% this year. All business together plans an increase of 5% over the total for 1954.

The rising trend of capital spending may carry far beyond 1955, judging by industry's present plans. These indicate only about a 3% drop in 1956 from the 1955 plans. In the past, plans for future years have always been sharply lower than those for the current year. If preliminary plans are revised upward—as they have always been in the past—1956-58 will be years of high, and perhaps record, capital expenditures.

Plans for Utilities . . . Overall U. S. business plans to spend $29.4 billion for new plants and equipment in 1955, about 5% above 1954. While the largest increase planned (15%) is by commercial companies, gas utilities and manufacturing companies will also spend more than in 1954. Electric utilities, railroads and mining companies plan small reductions from their capital spending in 1954. Other transportation, communications, and petroleum companies will remain at 1954 level (Table I).

Manufacturing industries plan to spend $9.2 billion for new plants and equipment this year, about 3% more than in 1954. Among major manufacturing industries, the largest capital increase (28%) is expected in primary metals industries—nonferrous metals, iron, and steel.

Chemical processing companies plan to spend 7% more than they did last year. Textile companies will increase expenditures 5% over last year, and miscellaneous manufacturing, 3%.

The present survey reveals a major switch in industries' plans since last fall. At that time a survey indicated that spending by manufacturing industries this year would be 7% lower than in 1954. All but three of the major manufacturing industries have increased their plans since that time.

Some of the changes are striking. Last fall, iron and steel companies planned to cut their capital spending by 3% this year. Now they plan to increase it by 29%. Machinery companies changed from a reduction of 1% to an increase of 14%, and paper companies from a cut of 6% to an increase of 10%.

The effect of business recovery following the mild recession of business in late 1953-54 shows clearly in the survey results.

Manufacturing industry plans to increase its productive capacity by 5%

Table I—Capital Expenditures

(Millions of Dollars)

	Actual[1] 1954	Planned 1955	Per cent Change 1954–1955	Preliminary Plans 1956	1957	1958
Primary Metals	811	1,042	+28	1,142	899	937
Iron and Steel	*628*	*810*	*+29*	*850*	*737*	*802*
Nonferrous	*183*	*232*	*+27*	*292*	*162*	*135*
Metalworking	3,249	3,145	− 3	2,727	2,579	2,497
Machinery	*694*	*792*	*+14*	*690*	*673*	*642*
Electrical Machinery	*439*	*483*	*+10*	*415*	*401*	*367*
Autos	*1,295*	*984*	*−24*	*915*	*836*	*817*
Transportation Equipment (including aircraft)	*191*	*199*	*+ 4*	*109*	*92*	*94*
Other Metalworking	*630*	*687*	*+ 9*	*598*	*577*	*577*
Chemical Processing	2,827	3,017	+ 7	2,821	2,825	2,775
Chemicals	*1,130*	*1,243*	*+10*	*1,218*	*1,330*	*1,318*
Paper	*455*	*501*	*+10*	*381*	*366*	*371*
Rubber	*131*	*122*	*− 7*	*118*	*124*	*121*
Stone, Clay and Glass	*361*	*461*	*+28*	*448*	*418*	*447*
Petroleum Refining	*750*	*690*	*− 8*	*656*	*587*	*518*
Food & Beverages	765	712	− 7	606	672	631
Food	*534*	*585*	*+10*	*500*	*506*	*497*
Beverages	*231*	*127*	*−45*	*106*	*166*	*134*
Textiles	331	349	+ 5	303	320	320
Miscellaneous Manufacturing	932	961	+ 3	962	942	877
All Manufacturing	8,915	9,226	+ 3	8,561	8,237	8,037
Petroleum Industry[2]	4,900	4,913	0	4,961	4,921	4,920
Mining	396	387	− 2	298	237	251
Railroads	854	820	− 4	812	795	754
Other Transportation & Communications	2,975	2,969	0	3,082	3,026	2,743
Electric & Gas Utilities[3]	4,219	4,430	+ 5	3,766	3,544	3,987
Commercial	6,379	7,336	+15	7,556	7,629	6,969
All Business	27,888	29,391	+ 5	28,380	27,802	27,143

1 Department of Commerce, Securities and Exchange Commission, McGraw-Hill Department of Economics
2 Petroleum refining, included under both manufacturing and petroleum industry, is counted only once in the total
3 Electrical World, American Gas Association, for 1955-58.

Capital Spending Plans

in 1955 and by another 11% by the end of 1958 (Table II). This rate of increase is somewhat smaller than the one recorded during the recent period of defense expansion; manufacturing capacity increased by 7% in 1951, 9% in 1952, and 7% in 1953. Capacity increased by 5% in 1954.

Chemical, paper, and electrical machinery manufacturers plan the largest additions to capacity in the 1955-58 period, reflecting the particularly large gains they expect in their sales. Transportation equipment (other than auto) companies plan the largest increases in 1955 alone—8%—while chemical, paper and electrical machinery companies aim for a 7% increase this year.

Manufacturers plan to devote more of their capital spending to expansion, and less to replacement and modernization this year (Table III). This reverses a trend that has been maintained for several years. They indicate intentions of using 47% of their capital spending for expansion and 53% for modernizations this year, compared with 42% and 57% last year.

Expenditures reported in the McGraw-Hill study this year are not directly comparable with those reported in previous surveys. The survey this year covers commercial companies, which previous surveys did not. In addition, expenditures in a number of other industries have been reclassified to make them more useful.

Table II—Expansion of Capacity in Manufacturing Industry

	Index of Industrial Capacity (1939—100)			Capacity—% Increase		
	Planned					
	1954	1955	1958	1953–54	1954–55	1955–58
Primary Metals	181	186	202	2%	3%	8%
Iron and Steel	*150*	*153*	*164*	*2*	*2*	*7*
Nonferrous	*281*	*292*	*327*	*5*	*4*	*12*
Metalworking	376	401	452	5	6	12
Machinery	*338*	*358*	*405*	*4*	*6*	*13*
Electrical Machinery	*488*	*522*	*600*	*8*	*7*	*15*
Autos	*214*	*223*	*245*	*6*	*4*	*10*
Transportation Equipment (including aircraft)	*520*	*562*	*624*	*6*	*8*	*11*
Other Metalworking	328	348	390	5	6	12
Chemical Processing	312	330	389	5	6	16
Chemicals	*417*	*446*	*544*	*6*	*7*	*22*
Paper	*292*	*312*	*362*	*5*	*7*	*16*
Rubber	*273*	*287*	*316*	*7*	*5*	*10*
Stone, Clay and Glass	*239*	*251*	*286*	*4*	*5*	*14*
Petroleum Refining	*218*	*220*	*229*	*5*	*1*	*4*
Food & Beverages	168	176	192	4	5	9
All Manufacturing	229	240	266	5	5	11

Table III—Expansion vs Modernization

(Per cent of capital expenditures)

	1954		1955	
	Expansion	Replacement & Modernization	Expansion	Replacement & Modernization
Primary Metals	42%	58%	46%	54%
Iron and Steel	*39*	*61*	*44*	*56*
Nonferrous	*54*	*46*	*53*	*47*
Metalworking	41	59	41	59
Machinery	*33*	*67*	*37*	*63*
Electrical Machinery	*51*	*49*	*52*	*48*
Autos	*42*	*58*	*38*	*62*
Transportation Equipment (including aircraft)	*32*	*68*	*48*	*52*
Other Metalworking	*45*	*55*	*41*	*59*
Chemical Processing	54	46	60	40
Chemicals	*69*	*31*	*77*	*23*
Paper	*53*	*47*	*57*	*43*
Rubber	*43*	*57*	*41*	*59*
Stone, Clay and Glass	*45*	*55*	*62*	*38*
Petroleum Refining	*39*	*61*	*33*	*67*
Food & Beverages	42	58	33	67
Beverages	*67*	*33*	*69*	*31*
Food	*31*	*69*	*26*	*74*
Textiles	5	95	23	77
Miscellaneous Manufacturing	35	65	46	54
All Manufacturing	43	57	47	53

Tax Write-Offs . . .

. . . reinstigated by ODM for electric power companies to boost U. S. capacity

The government is again granting tax write-offs to electric power companies. It wants to boost national capacity to 150 million kw by the end of 1958, so it's reopened and increased its expansion goal, closed down since December, 1953.

The decision to once again provide tax incentives to get more plants built was made by the Office of Defense Mobilization in conjunction with the Interior Department. ODM is responsible for determining what the country needs in the way of industrial capacity, and for working out ways of getting it. It's been studying the power problem for two years, and the increase of 34 million kw over the old goal represents the best guess as to what will be needed to continue the nation's rapid peacetime industrial growth, plus a margin to keep up with the overnight drain of any future mobilization buildup.

During Korean War days, this top planning agency set forth on a program to expand national generating capacity to 116 million kw by the end of this year. By the end of 1953, utilities had applied for tax write-off certificates for all of this, and as of the

(*Continued on page* 64)

BRIG GEN K. E. FIELDS

Gets AEC Post

Brig Gen K. E. Fields was named general manager for the Atomic Energy Commission, succeeding Maj Gen K. D. Nichols. Like Nichols, whose intention to resign was announced some weeks ago, Fields is an Army engineer. He is retiring to take the new post on April 30.

Nichols will become an engineering consultant in Washington.

Fields has for eight out of the last ten years been associated with the atomic energy program. First he was assistant to the commanding general of the Manhattan Project, and then assistant to director of military application for AEC. Since 1951 he has been director of AEC's military effort.

Fields' experience also includes service with the Jacksonville and New York Army Corps of Engineers' Districts, and the waterways experiment station at Vicksburg, Va.

Washington Briefs

Southwest Power—The House and Senate have both passed appropriations bill giving Southwestern Power Administration $400,000 to continue contracts with Missouri-area co-operatives for the rest of 1955.

Upper Colorado—The Senate debated the billion-dollar Upper Colorado bill. Passage was expected before the week was out. The Senate Interior Committee's favorable report on the measure took no notice of the partnership offer made by ten Colorado-area utilities.

Changes in Partnership Policy

. . . being initiated within the industry include local utility financing and power use, but government ownership

The Eisenhower Administration's partnership power policy is in for some face-lifting.

The change is basic, and it's being initiated within the industry. It holds such promise, politically and economically, to make it a natural for adoption as new Republican policy.

Here is what it is:

Utilities and other local interests will offer to finance completely construction of power facilities in large multipurpose water projects. They will make no claim to title of the power plants and dams—all they want is the guarantee of power produced.

The partnership concept which has guided the government for the last two years has run into a lot of political trouble because utilities which finance power facilities get to own them outright. The new idea is designed to offset "give-away" charges of public power groups.

U. S. to Build, Operate

The new scheme recommends that government build, own and operate these power facilities—all on somebody else's money. The government would pay for flood control, irrigation, and navigation features of the projects—the cheapest portions of overall costs.

The new partnership approach will be wrapped up in legislation soon to be introduced in Congress. The bill will call for construction of the one million-kw John Day Dam on the Columbia River in Oregon, which has Interior Department backing as a strictly federal project.

The legislation will provide that three Pacific Northwest utilities—Portland General Electric, Pacific Power & Light, Washington Water Power—chip in a total of $273 million on the cost of the $310 million project, leaving the government to finance only $37 million for nonpower features.

The government would own and operate the complete project, and the companies would get nothing but the power output. They will use what they need of this, then put the rest into the Northwest power pool, which will integrate it with all major projects in the area. This is in accordance with the Army Corps of Engineers' comprehensive long-term plans for the Columbia River Basin, and it will make it possible for the government, at the least cost, to make river navigable all the way to Pasco, Wash.

The plan is open for all types of local units—municipalities, public utility districts, co-operatives, as well as private utilities—to participate in the power phase financing. All they have to do is qualify as power distributors, and be willing to chip in on construction costs.

Plans have been underway to put the idea before Congress several weeks ago. But the utilities sponsoring the program wanted to be dead-sure they could get the money to pump into the project, and that they could clear holding company act hurdles. They're now satisfied there will be no trouble getting financial backing. Each participating interest would have to come into a subsidiary organization, which would effectuate contracts and distribute the power.

The sponsoring utilities may need a holding company act amendment to enable them to put their plan across. But, since this is more or less part of the overall plan, it won't cause much more trouble than putting the whole program across. New concept may not get far this year, but it is expected to be plugged hard in '56.

Coon May Sponsor Bill

John Day Dam partnership was the subject late last year of legislation by Rep Sam Coon (R-Ore.). Coon proposed participation by local utilities, and he is expected to be the sponsor of this first new partnership attempt this year.

Coon's bill last year estimated John Day construction costs at $320 million. It would have authorized company contribution of $164 million in power facilities, which they'd own. Apparently, cost estimates have changed some, but whether estimated power output has been changed is not known.

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FOR INFORMATION on the Kitchen Lite and other important high-wattage lamps—for information on Sylvania's customer brochures and mailing pieces—contact your nearest Sylvania District Office—or WRITE Dept. 5L-2809, Lighting Division, SYLVANIA ELECTRIC PRODUCTS INC., Salem, Mass.
In Canada: Sylvania Electric (Canada) Ltd., University Tower Building, Montreal.

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Picture-list of ways to spend

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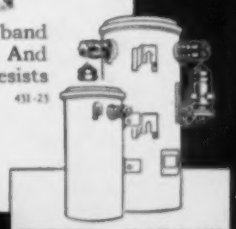
Easy to open. The one-piece cover band comes off with only a screwdriver. And it's made of stainless steel which resists corrosion and maintains a tight seal. 431-23

*ATANA. Since only G.E. gives you all these money-in-the-bank features, it should be obvious that *All Transformers Are Not Alike*. General Electric Company, Schenectady 5, New York.



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TVA Revisited

Former TVA Chairman Lilienthal returns to Valley to join attackers of Administration

Former TVA Chairman David E Lilienthal recently took off from his Wall Street office to visit his old stomping ground—source of frequent attacks against "Wall Street interests," in the utility business.

He made several addresses, including one at Athens College, Athens, Ala., where he gave his support to local control and financing of future TVA power expansion. Said Lilienthal: "The Valley itself, through a region-wide, nonprofit corporation, or by some one or more of its municipalities, may decide to secure the funds and take over the function of building the needed steam-power additions to the TVA system, the power to be handled through the TVA itself . . ."

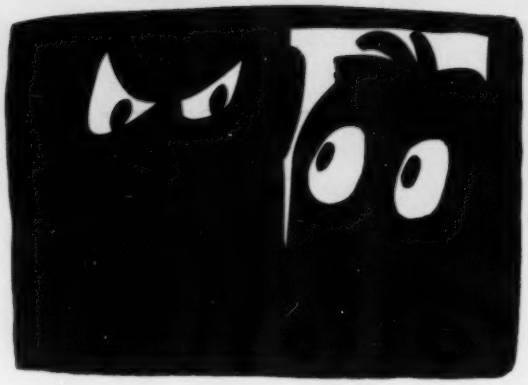
"Personally, I happen to think this is the best course, for the long pull, and the sooner the better . . ."

No Shortage of Capital Seen . . . Whatever the method of raising funds, said Lilienthal, the people of the Valley could be sure of one thing: "Where there is a great economic need for power, and that power can be produced, from coal at a total cost of less than four mills a kwhr, as you folks can in this Valley, the capital will be forthcoming, and the power produced."

The former TVA leader noted that Tennessee Valley region "has won the confidence of the major industrial companies of this country as a place to do business." In a decade, he added, it will "definitely be one of the three leading industrial centers of this whole country."

Touches on Dixon-Yates . . . Lilienthal, saying he wouldn't go into the merits of the project, said "the Dixon-Yates device is not an alternative way of providing power for the Valley . . . But the demise of Dixon-Yates will not provide an affirmative answer."

He praised the quality of TVA management, and its low construction and operating costs. And, he said, "power from coal can be produced here in this Valley at extraordinarily low cost. The industrial importance of this is now becoming more fully realized."



Stalking Vandals in the Dark

Outraged residents in northeast Spokane are stalking sharp-shooting vandals in the dark.

Despite protests against unlighted streets, the city has refused to replace lights which have been broken three times or more in the last few weeks. City Utilities Commissioner Willard Taft hopes the blackout will spur residents to track down the light-smashing vandals.

"Our policy," Willard declared, "is that after lights have been broken three times, we will not replace . . . until the persons who broke them are apprehended."

POWER BRIEFS FROM THE NEWS

● Authority to install a fourth 90,000-kw generator at its Ross hydroelectric plant on the Skagit River has been received by the City of Seattle from the Federal Power Commission. The unit, permitting full utilization of the potential power available from water stored behind Ross Dam, is scheduled for completion in the fall of 1956 at an estimated cost of $5,333,900.

● South Carolina Electric & Gas Co has ordered a $19 million, 125,000-kw steam generator for its new plant on which construction will begin in 1956.

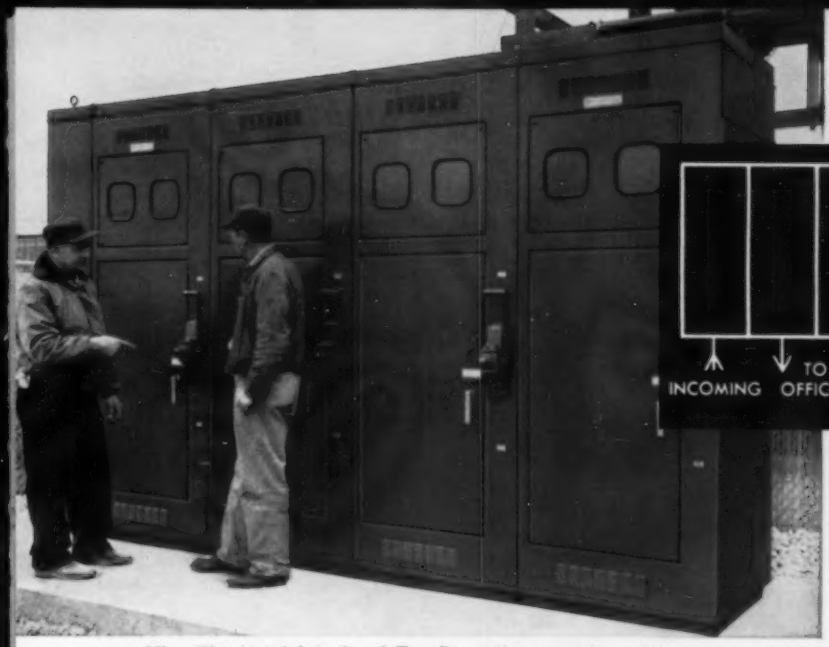
● Following construction budgets for 1955 have been announced by these utility companies: Consolidated Edison Co of New York, $95 million; Long Island Lighting Co, $50 million; Boston Edison Co, $22 million; Northern Indiana Public Service Co, $54 million; Florida Power & Light Co, $41.3 million; Commonwealth Edison Co, $125 million; Kansas Power & Light Co, $16 million; Virginia Electric & Power Co, $53 million; Kentucky Utilities Co, $18,741,000; Georgia Power Co, $32 million; Gulf States Utilities Co, $23 million; Mississippi Power & Light Co, $6.5 million; California Electric Power Co, $11.5 million; El Paso Electric Co, $3,616,500; Dallas Power & Light Co, $42 million for both 1955 and 1956; Appalachian Electric Power Co, $22 million; Tampa Electric Co, $9 million; Alabama Power Co, $35 million; Jersey Central Power & Light Co, $18,529,000; Puget Sound Power & Light Co, $75 million in the next five years.

● Los Angeles Department of Water and Power has cancelled filings for proposed power developments on the Kings River, Fresno County, Calif. Excessive cost of producing power caused the department to abandon the project.

● Artesia (N. M.) City Council has ruled that Southwestern Public Service Co must pay $12,000 total cost of moving its distribution lines from the right-of-way for a new divided highway, now under construction.

● Northern States Power Co, of Minneapolis, has asked Federal Power Commission for license to step up its Menomonie hydro plant from 1,200 kw to 5,400 kw.

● Mobs, outraged by the recent power shortages, reportedly wrecked the offices of the Mato Grosso Power Co in Corumba, on the Brazil-Bolivia border.



Wm. Wetsig (right), Jewel Tea Co. engineer, confers with John Corsiglia of Hyre Electric Co. installation contractor.

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MR. SOL KRIVO

Chief Electrical Engineer for A. Epstein & Sons—Chicago architect-engineers—planned the high-voltage supply system for the newest Jewel Tea Company building. He says, "Since S&C were the originators of this type of outdoor metalclad switchgear, we are sure they have the 'know-how' to furnish equipment best fitted to our jobs. Our customers have been completely satisfied by the simplicity, low cost, and easy maintenance of S&C Metalclad Switchgear."

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All-Electric Home Seen at Hand*

Mushrooming of air conditioning, concomitant lowering of system load factor create urgency for electric utilities to promote the year-round heat pump

PHILIP SPORN, President, American Gas & Electric Co, New York 8, N. Y.

The electric utility industry is today within reach of the all-electric home, its goal for the past quarter century. While developments in recent years have favored the equipment of many homes with radiant or resistance heating and air conditioning, the industry has cogent reasons for concentrating its commercial efforts on the reversible heat pump.

This is the air conditioning age. The air conditioning industry's present annual sales of more than $2 billion are expected to reach more than $5 billion by 1965. Of these total sales, about 50% will be central plant equipment and the larger packaged self-contained units for commercial and industrial applications. The remaining half will consist of room coolers whose sales have expanded from 43,000 units in 1947 to 500,000 in 1953, and to the year-round packaged conditioners whose sales have risen from virtually nothing in 1946 to about 120,000 units last year. Thus room cooler sales have multiplied close to 12 times in the past six years, an average of about 50% per annum compounded.

At least 40% of today's prominent contractors, including three of the larger prefabricated home builders, are offering year-round conditioning to the public. Some 80 manufacturers are involved in one or more phases of this air conditioning business. It is not unrealistic to anticipate that year-round air conditioning will be standard equipment in practically all new homes within ten years.

The size of this market is suggested by the fact that since 1950 about 3 million homes have been built and that another million are under construction each year. The birth of more than 4 million babies in this country last year augurs that this expansion will continue. Furthermore, about 67% of our homes today are more than 20 years old, and 50% more than 30 years old. Of these, at least 10 million are excellent prospects for year-round air conditioning.

1. Summer air conditioning in homes; offices; and commercial, industrial, and institutional buildings is rapidly becoming an accepted must and for the most part will be electric

Commercial and industrial air conditioning installations can be expected to increase in about the same proportion as residential installations. Almost all major office buildings constructed since World War II have complete air conditioning, and about 15% of the desirable commercial office spaces are air conditioned in many localities. This 15%, according to real estate authorities, is the critical percentage at which owners feel compelled to install air conditioning to maintain rent levels and retain tenants.

To the utilities the significant aspect of this trend, granted that it will continue, is that practically all of the air conditioning load will be electric and will be added to utility company electric lines.

2. Development of summer air conditioning load has already had a deep and not too favorable effect on electric utility systems which is bound to be aggravated in the future

The probable extent of this summer air conditioning growth and its effect upon the electric utilities must be evaluated. Fairly reliable predictions can be made on the probable expansion of both, based on the continuation of the trends of the past two or three years.

The non-coincident peak demand of the total electric utility load was about 85 million kw in 1954; that predicted for 1965 is 184 million kw. Comparatively, the estimated 1954 and 1965 non-coincident demands due to air conditioning, including necessary auxiliaries, are 20 million and 59 million kw, respectively.

Accordingly, while the 1954 air conditioning load was about 24% of the total non-coincident peak demand, the 1965 load is expected to be about 32%. On the other hand, the corresponding estimated 1954 and 1965 summer air conditioning kilowatt-hours account for only about 5 to 7% of total energy sold.

These comparisons of demand and corresponding energy components signify that the air conditioning load is apt to have a high demand and a low annual load factor. The average annual load factor (on a non-coincident basis) for the predicted summer air conditioning load will range, in all probability, between 6 and 15%. This value is far below today's annual load factor for the utility industry of 64%.

Consequently, with present trends holding, summer air conditioning will continue to be a difficult, if not an almost impossible load to service profitably. Besides its high demand and low annual load factor, its highest demands will occur on the relatively few extremely hot days when load carrying capacity of the system is considerably lower than in winter. Growth of air conditioning inevitably creates a system summer demand peak.

In Southern and Southwestern areas, summer peaks are being experienced even with the present relatively small saturation of air conditioners. During July 1954 the sharpest and most widespread increase in system demand in the industry's history occurred in states from Kansas and Missouri southward to the Gulf. This demand, ranging from 13 to 23% above the previous year, increased in direct proportion to the rise in outdoor temperature. Increased public acceptance of air conditioning will not only intensify this condition but spread it to Northern areas as well.

* This paper was delivered at the 21st Annual Sales Conference of the Edison Electric Institute, Chicago, Ill., March 30, 1955.

3. Solution to high summer air conditioning peak, with corresponding low annual load factor, is a winter load—electric heating

As the most obvious solution to the utilities' problem is the development of winter load, the most logical means on the horizon is electric heating, either resistance heating or the heat pump. When wide acceptance of summer cooling materializes, as predicted, this cooling will become an impressive percentage of the total residential load.

Energy for residential use now accounts for about 26% of the total industry sales. Residential summer air conditioning, on the other hand, is now only 1.8% of the total residential consumption. By 1965, however, this consumption is expected to be 10%. When electric heating has been added, the summer kilowatt-hours can be doubled or tripled without appreciably affecting maximum kilowatt demand.

For instance, assuming an average fully insulated house, the residential consumption for electric winter heating could very easily be in the range of 12,000 to 22,000 kwhr, depending on the type of heating system and the geographic location. This is in contrast with the 1,000 to 3,500 kwhr normally consumed for comfort cooling. The additional electric heating load would raise the annual load factor to 20 to 25% from the 6 to 15% expected from cooling alone. It would practically assure an all-electric residence, one with a 20,000 to 32,000 kwhr annual use instead of the 2,600 kwhr present average.

4. In the coming quadrupling growth of electric utility industry, it becomes almost mandatory to develop year-round air conditioning load to keep the proper balance and stability in the financial structure and in revenue and earnings

The driving force behind the inevitable quadrupling of the country's output and use of electric energy is our dynamic economy in which a population growth of close to 60 million in the next two decades will be an important factor. It is generally agreed that this 40% increase in population will be accompanied by an increase in the labor force of 20% and in the hours worked of 10%.

This additional 60 million will have to be taken care of —raised, educated, fed, clothed, housed, and entertained— at the higher living standards through this modest increase in labor working hours. This can be done only through increased productivity resulting from intensified and more effective use of tools, equipment, and electric energy.

The obvious disparity in the rate of growth between industrial use and population must affect the revenue and income of the utilities. To keep their financial structures in balance, utilities must make extraordinary efforts to keep residential energy sales in step with industrial growth. This seems almost impossible without the year-round air conditioning load.

5. The heat pump is the ideal solution for year-round air conditioning of homes as well as commercial establishments

The heat pump can furnish winter heating requirements, affording the utilities additional load without appreciable increase in the kilowatt demand. It should also reduce consumption to ⅓ to ¼ of that required by resistance heating. Although progress of the residential packaged heat pump unit has been disappointing to date, more speed can now be expected. Manufacturers are making good headway, several being of the opinion that within four or five years, as quantity production increases, the first cost will come down sufficiently to make the heat pump much more competitive in the mass market with fuel-fired heating-air conditioner combinations.

The residential market for the heat pump is potentially large and attractive. The commercial market is equally as attractive and can result in many practical applications right now. Year-round air conditioning is accepted in modern commercial structures, where the heat pump has proved to be very satisfactory in both first and operating costs. In practically all commercial installations investigated, the heat pump has considerably improved the annual load factor over that obtained with a conventional cooling system.

6. Promotion of year-round air conditioning and the heat pump does not preclude developing the electric resistance heating market where heating only can be sold

Where year-round air conditioning is not fully accepted, the electric utilities have still another ideal form of heating to promote and sell. This is resistance heating.

Some utilities are of the opinion that even a relatively small saturation of resistance house heating will be unbearable. This is not necessarily true when certain installation precautions are taken and other loads are developed to offset the winter demand. Resistance heating can and is being sold in direct competition with fuel-fired equipment. Most operating costs are not objectionable, and resistance heating has many desirable inherent advantages over competing equipment.

Indicative of what can be accomplished in promoting resistance heating are the 1,000 house installations added to the American Gas & Electric System in 1954, the first year of promotion of this load. While not a staggering increase, this is more residential resistance heating than has been added in the history of the company.

7. Promotion of electric resistance heating and of the heat pump is essential to protect the residential appliance market to assure continuous and increasing sales of electric ranges, water heaters, laundry dryers, incinerators, and other desirable electric appliances

There is a strong trend at present to gas for residential heating and to electricity for air conditioning. The electric utilities are in a reasonably favorable position to continue getting a major portion of the cooling load, residential and commercial. So far they have little reason to be concerned about the gas-generated cooling unit, such as the new gas-driven heat pump.

Perhaps the electric utilities have little to be apprehensive about, provided the summer cooling load can be made profitable enough to be properly encouraged. Nevertheless they cannot continue to serve cooling installation profitably without obtaining a considerable portion of the heating load as well.

(*Continued on page* 18)

Heat Pumps Seen Expediting the All-Electric Home

(*Continued from page* 17)

Gas companies are adding more than a million house heating customers a year. At the end of 1954 more than 14 million homes were heated by gas. This figure is about half the country's gas customers. Gas companies are capitalizing on the strong trend to gas heating to obtain an impregnable position in that market and are utilizing their position to promote gas cooking, hot water heating, laundry drying, and other uses which are taken for granted by many electric utilities as inevitably electric. If successful, this promotion could seriously jeopardize the retention and badly needed expansion of the electric appliance market. For electric utilities the most effective solution to the problem of dual utility services is to make the home all electric. This means electric heating and year-round air conditioning, or, at its best, the heat pump.

8. Getting a substantial share of the heating market and bringing about a condition where a reasonable percentage of American homes and commercial establishments is completely air conditioned year-round electrically is not going to be an easy task

The winter heating load cannot be obtained by the electric utilities for the asking. The gas industry, with its large network of pipelines throughout the country, must continue to obtain a large volume of heating load to remain economically sound. It would like to get a large part of the cooling load to balance the heating load and thus improve its own annual load factor. And, as I have pointed out, the gas industry is aggressively promoting many appliances not only to recapture markets which have been lost, but also to open up new markets, such as summer cooling, which at present is considered exclusively electric. The gas industry is as anxious to have all-gas homes as the electric industry is to have all-electric homes.

9. Electricity, particularly when backed by the heat pump, holds many advantages in the competitive struggle with fuel-burning equipment for the year-round air conditioning market

Compared with fuel-burning equipment, electric heating and year-round air conditioning, particularly when the heat pump is employed, have many inherent advantages. These include ease of close control for added comfort, cleanliness, simplicity, convenience, and safety. Another inestimable advantage is the fact that although oil and gas reserves are large, they are not inexhaustible. Electric energy from hydro and coal is assured for centuries and with the coming of nuclear fuel for thousands of years.

Thus the energy future is an electrical future.

10. With the development of a substantial electric year-round air conditioning load, the means will become available to utilities, manufacturers, contractors, and dealers to develop the load to its fullest potentialities

The fact that electric heating and electric year-round air conditioning and the heat pump do not play a larger part in either the utilities' or in the American economy is due to a good many reasons. The failure of the entire electrical industry to visualize the importance and potentialities of this load is perhaps the most significant. But that should be no barrier to going ahead. The electric industry has the necessary electric appliances and products for today's new homes, and experience shows that people want them.

It is astonishing how much excitement and interest is created whenever a well-designed all-electric home is exhibited. All-electric homes can be and are being sold. And the utilities have the capacity and the technical means to serve them profitably. The fact that the market potentials were not visualized ten or twenty years ago ought to act as additional stimulus and incentive to get the load now.

With the pick-up in market there will come the means to carry out further research and market development to improve product, improve performance, and lower cost.

The future is with us. The year-round electrically heated and air-conditioned home, the heat pump-conditioned home—the all-electric home—is, for the future, obvious.

Let us bestir ourselves. Let us make the obvious of the future, the reality of today and tomorrow.

PG&E Awards Poe Project Contract

A contract for driving a 24-ft-diameter tunnel a distance of 6¾ miles for Pacific Gas & Electric Co's Poe hydroelectric project on the Feather River was awarded earlier this month to Utah Construction Co and Bates & Rogers Construction Corp.

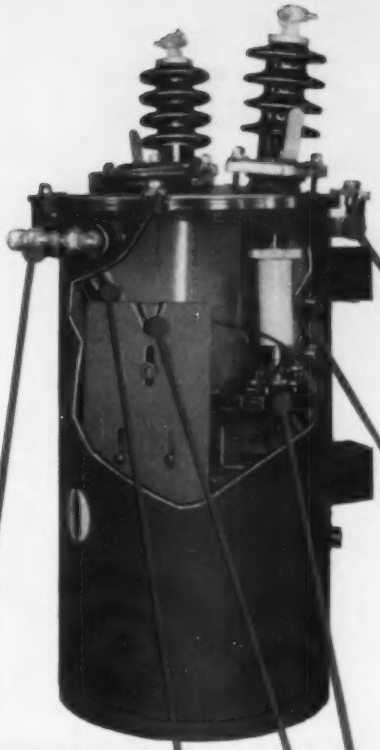
The Poe Project is a $35-million development to provide additional power for northern and central California. Poe powerhouse will be the seventh in PG&E's chain of hydroelectric plants on the north fork of the Feather. Generating 106,000 kw of electricity, it will bring the company's total capacity on the river to nearly half a million kilowatts.

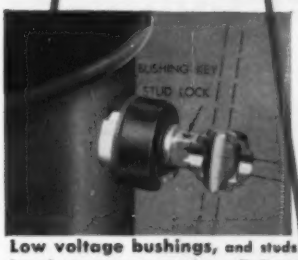
Construction of the tunnel will be a major portion of the total project. Concrete lining, in part, will bring finished diameter to 19 ft.

Construction for the powerhouse will begin in the summer of 1956 and will be followed by work on a diversion dam 60 ft high from streambed immediately downstream from the tunnel intake. These jobs will be covered by separate contracts.

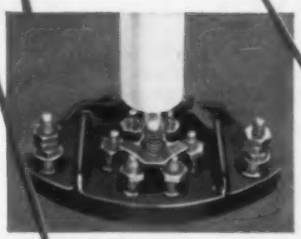
PG&E has a license for another project on the north fork of the Feather River involving the construction of three more powerhouses with a combined generating capacity of 258,000 kw. Their construction will complete the company's development of the river's hydroelectric potential.

NEW KUHLMAN FEATURES

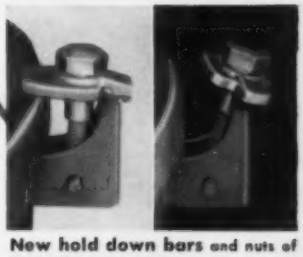




Low voltage bushings, and studs keyed to prevent rotation, eliminate all possibility of internal short circuits. Bushing connectors are designed for three way entrance of low voltage leads . . . from above, below, or front.

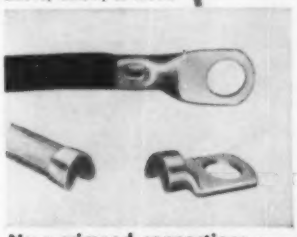


Improved "floating" action tap changer maintains positive pressure on both contacts by a spring actuated self-aligning mechanism.



New hold down bars and nuts of forged brass maintain a uniform pressure-seal on transformer tanks . . . are not subject to rust or corrosion . . . do not have to be disassembled to remove cover as illustrated above (right).

Provisions for mounting either valve or expulsion type arresters are made on all Kuhlman transformers built to EEI-NEMA standards through 100 KVA single phase and 150 KVA three phase.



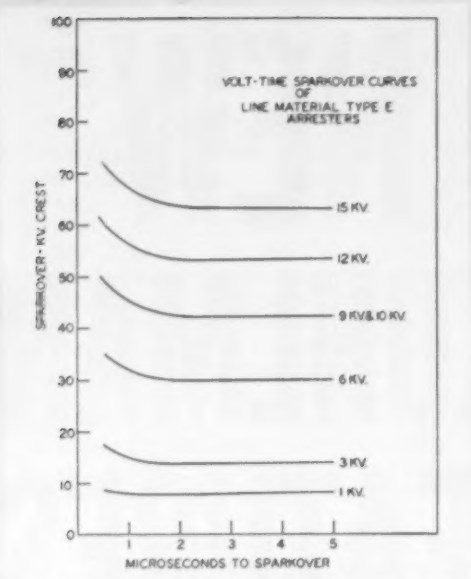
New crimped connections guarantee pullout values equal to 85% of the cable tensile strength and greater than 100% relative conductivity.

New die-formed indented slot in core clamp allows greater lifting hook clearance for ease in handling or removing core and coil assembly.

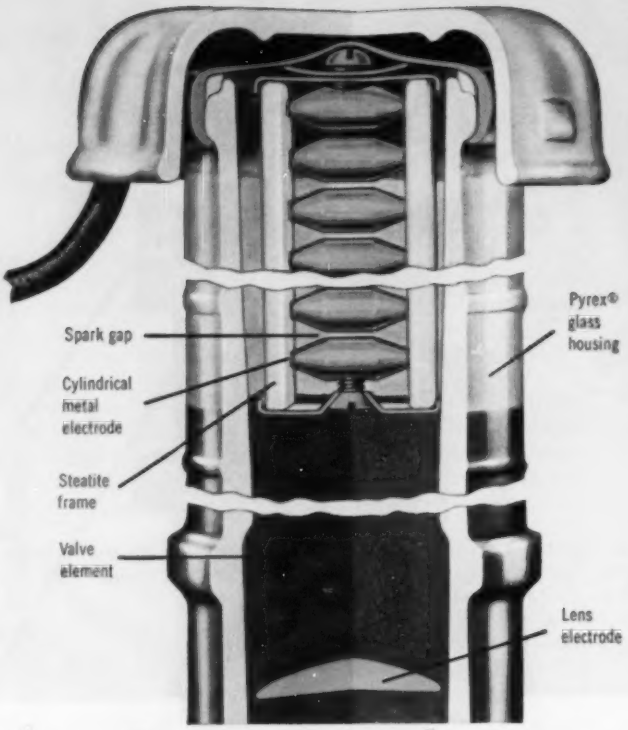
KUHLMAN

169

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA



Volt-time curves of arrester sparkover on impulse. These curves illustrate the quick response of the arrester to lightning surges. At all points of the curve the impulse sparkover of the arrester is for below the insulation strength of the distribution equipment being protected.



How L-M's Type E Valve Arrester Balances 60-Cycle Sparkover and Impulse Sparkover

By **GEORGE W. COOPER**
Manager
Protective Equipment Sales
Line Material Company

L-M's Valve Arrester spark gap is designed to prevent unnecessary 60-cycle sparkover of the arrester to harmless switching surges, whereas the low and consistent impulse sparkover brings the arrester into operation quickly and dependably in case of a dangerous lightning surge.

Precision Spark Gap

The spark gap is made of electrode members, accurately spaced and supported by a strong machined frame of high-grade steatite. The gap is so designed that its 60-cycle sparkover value is approximately 1.8 times the rating of the arrester under wet conditions. This is sufficient to keep normal switching surges from sparking over, and provides a path to drain off higher switching and lightning surges.

At higher surge voltages the combination of the metal electrode and the steatite produces an instantaneously ionized, electrically fast path. This combination, together with the cylindrical design of the electrodes, forms a ladder gap unit with a low impulse sparkover.

High Discharge Capacity

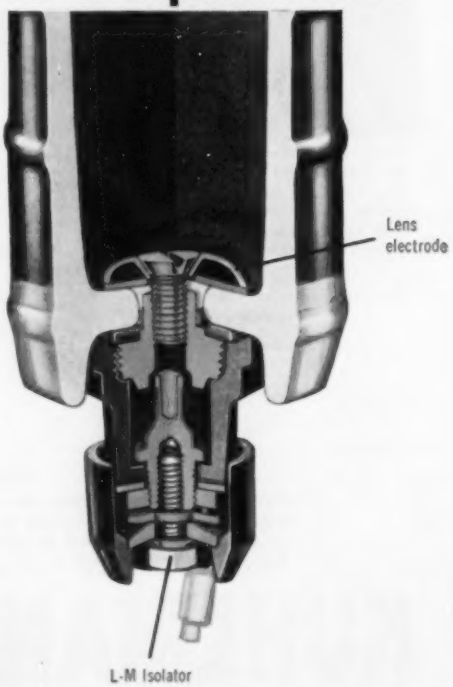
L-M's exclusive bonded valve element combines low IR drop with more than enough capacity to handle the 65,000-ampere surges prescribed by NEMA. It acts as a valve to limit power follow current to a negligible value.

The result of all these features is that the L-M Type E arrester is outstanding in the protection it provides, in its long life under severe lightning conditions, and in its permanent, never-changing characteristics. L-M valve-type arresters amply meet all NEMA standards.

In addition, L-M's "ISOLATOR" provides positive assurance against grounding feeders, by disconnecting the ground lead from the arrester, if the arrester should ever become damaged.

Get This Bulletin

Get the whole story of L-M arrester performance and application. Ask the L-M Field Engineer for a copy of Bulletin LA2; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



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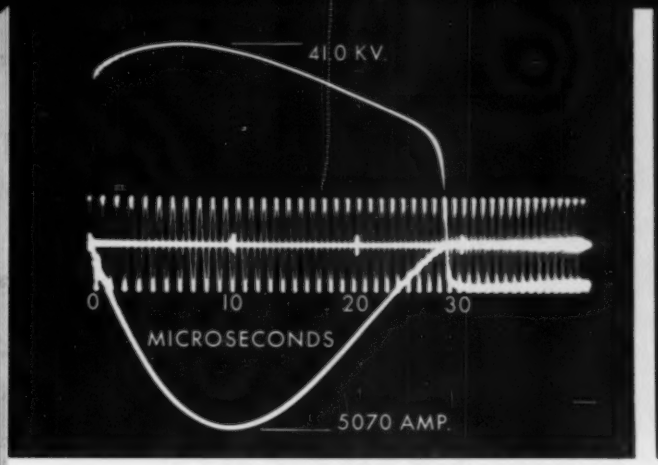
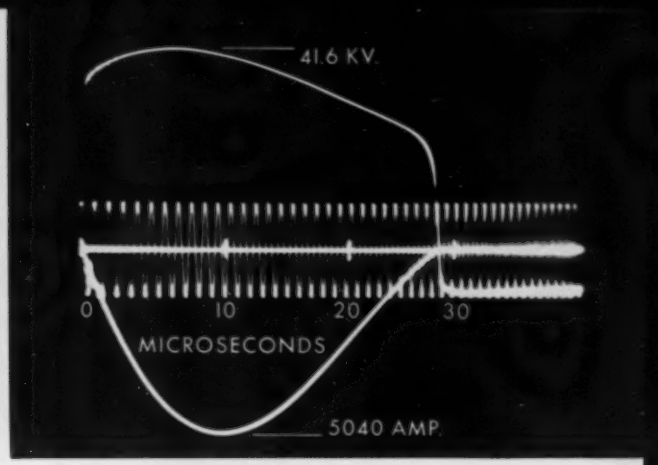
LINE MATERIAL *Lightning Arresters*



Before test: Oscillogram illustrates the electrical characteristics of an L-M 9 kv arrester before the AIEE Operating Duty Cycle Test of thirty operations using a 5000 ampere surge and 60-cycle follow current at the rated voltage of the arrester.



After test: Oscillogram of electrical characteristics of the same arrester after AIEE Operating Duty Cycle Test, illustrating the unchanging high degree of protection that is maintained throughout the life of the arrester.

How L-M's Type E Valve Arrester Provides Low IR Drop, High Discharge Capacity

By **GEORGE W. COOPER**
Manager
Protective Equipment Sales
Line Material Company

L-M's exclusive design of valve arresters provides the optimum amount of valve material to give balanced performance. The valve material must provide a low impedance path for surge currents to assure low IR drop, provide ample surge current capacity, and function as a valve to limit follow current until it is interrupted by the series gap.

Several factors contribute to the high discharge capacity or ability of the Type E arrester to handle heavy strokes of lightning without damage.

L-M's Molded-in Valve Element

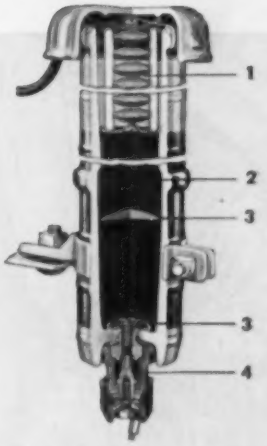
"Granulon," the valve material, was developed as the result of years of experience and research in distribution-type arresters. It is able to withstand severe heating which accompanies heavy strokes of lightning. The "Granulon" is mixed with a special non-charring, inorganic, glass-like binder; then molded directly into the glass housing at high pressure to form a hard, dense mass with outstanding discharge capacity and valve-action properties.

Lens-shaped electrodes are placed in the valve element to counteract the lightning surge current "skin effect." These electrodes have been scientifically designed to produce a multiple-path distribution of the surge current throughout the valve element, thus increasing the discharge capacity of the element and assuring long, uniform life.

Assures High Capacity

The characteristics of L-M's valve element combine optimum performance features with outstanding protection and long arrester life. These characteristics are retained permanently without change caused by aging or service.

In addition, the "Isolator" provides positive assurance against permanent fault to ground by disconnecting the ground lead from the arrester if the arrester should ever become damaged.



1. The ladder spark gap is designed to provide a perfect balance between 60-cycle sparkover and impulse sparkover.

2. "Granulon," the valve material, is able to withstand severe heating which accompanies heavy strokes of lightning.

3. Lens-shaped electrodes in the element counteract "skin effect" of surges, assuring even distribution of the discharge throughout the valve element.

4. L-M's "Isolator" gives positive assurance against grounding feeders by disconnecting the ground lead from the arrester if the arrester should ever become damaged.

Electrical Characteristics of Type E Valve Arrester

KV Rating	Minimum Impulse Sparkover 1½x40 Wave KV Crest	Front of Wave Sparkover KV Crest	IR Drop Across Arrester				
			1500 Ampere Surge	3000 Ampere Surge	5000 Ampere Surge	10,000 Ampere Surge	20,000 Ampere Surge
1	8	8	4 KV	4.5 KV	5 KV	6 KV	7 KV
3	14	17	11 KV	13 KV	14 KV	16 KV	18 KV
6	30	33	22 KV	25 KV	27 KV	31 KV	35 KV
9	42	49	33 KV	37 KV	41 KV	46 KV	53 KV
10	42	49	37 KV	42 KV	46 KV	52 KV	59 KV
12	53	60	44 KV	49 KV	54 KV	60 KV	67 KV
15	63	70	55 KV	62 KV	66 KV	74 KV	85 KV

(On wave rising 100 kv per microsecond per 12 kv arrester rating; 10 kv per microsecond for 1 kv arrester.)

Get the whole story of L-M arrester performance and application. Ask the L-M Field Engineer, or write for a copy of Bulletin LA2, Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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LINE MATERIAL *Lightning Arresters*

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To do his job well, your lineman needs the finest and most reliable equipment obtainable. And, for 84 years Graybar has supplied only the lines of tools, supplies and equipment best-suited to his needs.

Made by over 200 of the nation's leading manufacturers, they're all products your linemen know and respect – famous tool lines, for instance, like Klein, Simplex, Adams, Salisbury, Oshkosh, Coffing, Chance and many others.

Check your tool inventory with your local Graybar Representative. Remember, too, he's a convenient source of information on everything electrical for pole-line construction and maintenance. *Graybar Electric Co., Inc., Executive Offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.*

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Call Graybar first for...

Everything Electrical GraybaR ELECTRIC COMPANY

IN OVER 110 PRINCIPAL CITIES

A town gains new Kiwanis club and . . . clinic plans other improvements, as . . .

KP&L Spurs Community Self-Help

From a start with three communities as pilot projects, Kansas Power & Light's program for community self-improvement has spread to 16 others

JOANNE WEAVER, Kansas Power & Light Co., Topeka, Kan.

Kansas Power & Light Co's community development program has resulted in increased loads for the company and improved public relations. It has brought newer and better interior and exterior store lighting, increased use of air conditioners, and built new businesses. Establishment of water supplies has resulted in running water in homes and created a potential market for water heaters, automatic washers and clothes dryers.

Good will created in communities by the program has been noticeable. Citizens feel that some outside agency is interested in them and in their problems. The relationship between communities and the company has changed from an impersonal to a personal basis, that of neighbors working with neighbors to build a better community.

KP&L's program started with a pilot project of three communities. It was so successful in these that it spread to 16 other towns in a comparatively short time.

The three communities chosen for the pilot project were carefully selected for distinctive characteristics that would test the program. The towns were:

1. Rossville, Kan., population 625, located in a rich agricultural area.

2. Overbrook, Kan., winner of a national community betterment award in 1950, was resting on its laurels.

3. Carbondale, Kan., a booming coal mining town years ago with a population of 3,000, had become a ghost town of 500 population, with neither restaurant nor drug store. With a Strategic Air Command base only five miles away, the possibilities were tremendous.

NEW HIGHWAY SIGN on outskirts of Rossville proudly proclaims many new services, and friendliness of community

Community Guide Set Up . . . KP&L's Community Service Department, under the direction of H. S. Hinrichs, laid the groundwork by contacting citizens of the three towns and stimulating interest in the project. The idea was to present the citizens with a definite plan of action which they could carry out.

KP&L published a booklet, "Action Through Community Planning," to be used as a guide by the communities. This guide was followed in setting up machinery in each community. A sponsoring group, such as a civic or service club, assumed responsibility of leadership and did all the organizational work in each community under KP&L's guidance.

NOTE: In recognition of the Diamond Anniversary of the A.S.M.E., Combustion Engineering has directed this message to leaders of business and government, through the advertising pages of *Fortune* and *Business Week*.

In the roster of the glorious Greeks, Archimedes stands with the greatest. For he laid out the systems of dynamics . . . the science of bodies in motion . . . and laid the foundations of Mechanical Engineering.

Today, the Mechanical Engineer's concern with dynamics leads him into every aspect of our industrial and domestic lives. He helps produce our automobiles, our clothing, our magazines . . . our electric power and our locomotives. He gives us all a far better life—and helps plan an even brighter future.

Because this vital profession is so far-reaching, no one man can encompass every part of it. Acting as storehouse of this accumulated knowledge—and spearheading the critical task of achieving tolerable systems of *standards* in such varied things as bolts, belts and boilers—is his society, the American Society of Mechanical Engineers.

This year, the A.S.M.E. is seventy-five years old. Of its fine record of achievement, it can be justly proud. And Combustion Engineering—which for generations has been benefited by, and in some measure has contributed to, the work of the society—is delighted to wish the A.S.M.E. a happy diamond anniversary.

B-818A

COMBUSTION ENGINEERING

Combustion Engineering Building
200 Madison Avenue, New York 16, N.Y.

BOILERS, FUEL BURNING & RELATED EQUIPMENT; PULVERIZERS, AIR SEPARATORS AND FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

A place for youth to meet

Dances raise funds to finance projects

The sponsoring group promotes a community development association which is composed of a representative from each club and organization in the community. Local citizens are invited to a town clinic where the community development program is explained. They are asked to fill out suggestion cards that provide a working basis of needed improvements. The association classifies the suggestions and then appoints persons interested in certain projects to Action Committees to perform the improvement. Numerous Action Committees work at the same time.

Studies of the physical setting of the town, historical background, population trends, and trade and industrial potentialities are made by the townspeople. KP&L then compiles the information, writes a brief of the town, and files it with the Kansas Industrial Development Committee, the State Chamber of Commerce, and universities throughout the state. These briefs describe the potential of the community to industries seeking a new home.

Results Exceed Expectations . . . The success of the Community Development program is shown by accomplishments in Carbondale and Rossville.

The mining town of Carbondale had no civic or service club that could be inspired to awaken the town. So a Kiwanis Club was organized and now has 40 members. Individual citizens were inspired to act on various community problems.

One of the first projects tackled was that of a water supply. Water had been hauled by tank car from Topeka, 18 miles away.

For several years a Carbondale contractor had been scooping dirt and shale from an area on his farm to be used for road construction. The excavation was given to the community and made into a lake for the city water supply. A pipe line was run to the city and a filtration plant was installed. Plans call for landscaping the lake and turning it into a recreation and sporting center.

When Carbondale's maintenance man left, Kiwanis club members donated their time to this work. In return, the city pays the maintenance salary into the club's treasury. With this money the club has converted an old building into a youth center. A young couple has installed a soda fountain and kitchen to provide the town with its only restaurant. The youth center affords entertainment facilities for the whole town.

A clean-up campaign for main street produced new paint jobs for each building and the paving and marking of the main street. A home town boy returned and purchased the grocery store. He has completely redecorated and modernized the store and converted it into a grocery, furniture, and general store with a stylish front.

Other improvements include the starting of a boy scout troop, asphalt surfacing of all playgrounds, and a heating system installed in the youth center. The publicity given Carbondale's activities was instrumental in enticing a minister to the only church and in encouraging two young men to set up a printing shop and weekly newspaper.

Long range plans are to develop the business district and start a housing project that will meet the needs of the farm area and the nearby air base.

For the first time in many years the townsfolk of Carbondale are interested in their town and are actively engaged in making it a better place in which to live.

NEWLY CREATED LAKE at Carbondale provides an adequate water supply for town. Future plans include landscaping

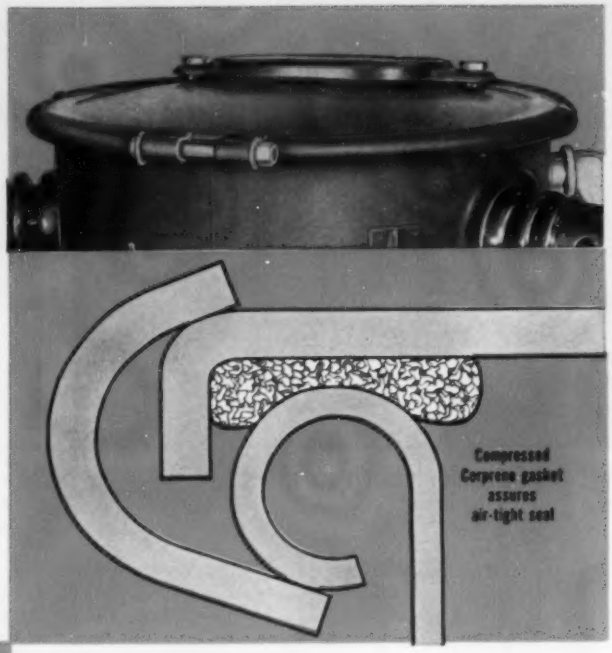
SHUR-SEAL COVER

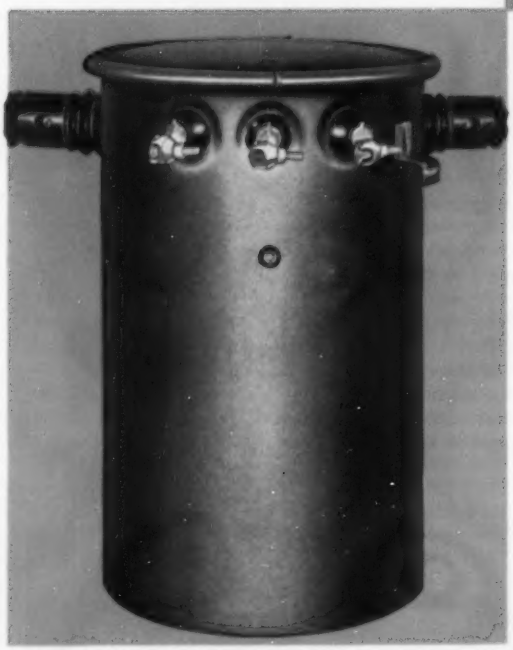
adds extra years of service life to

Wagner®

Form W

Distribution Transformers!





Write for your copy of Bulletin TU-180. It gives complete information on Wagner Distribution Transformers.

Wagner Form W Pole Type Distribution Transformers last years longer than many similar transformers on the market today for many good reasons. Among them is the fact that Wagner Transformers don't "breathe." They're sealed air-tight.

How? Wagner's exclusive Shur-Seal Cover is fitted with a clamping ring which maintains a uniform pressure, holding the cover tight to the tank. Although as air-tight as a welded tank, the cover may be removed by simply loosening a single, stainless steel bolt. No atmospheric moisture or dust particles can get inside. The inhibited oil used in Form W Transformers reduces oxidation to a minimum and retards the formation of acids and sludge which would eventually cause deterioration. Working together as they do, the Shur-Seal Cover and inhibited oil add years to the service-free life of Wagner Form W Distribution Transformers.

Other features of Wagner Form W Distribution Transformers...

HIGH VOLTAGE SIDEWALL BUSHING... for faster, easier, safer permanent connections. Lineman simply pushes conductor into the connector and tightens with a few twists of the knob. No tools are needed and the lineman is protected from accidental shock by the insulated knurled knob.

LOCKED LOW VOLTAGE BUSHING... Linemen never need worry about loose connections on the inner end of the terminal studs because the new, low voltage bushing assembly makes it impossible for these studs to turn when the terminals are being tightened. This feature also makes it safer for the lineman when connections are being made to the terminal.

FORM W TRANSFORMERS COME TO YOU IN DRUMS... Wagner Form W Distribution Transformers from 3 to 10 kva are now packed in sturdy, fiber drums for ease of shipping, handling and storage. Each drum is sealed so that when it is opened, the transformer is as clean and free of harmful foreign particles and grease as the day it left the Wagner plant.

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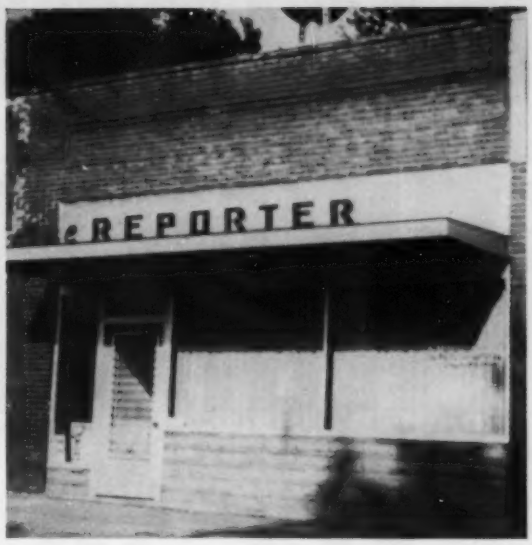
BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

T55-6

A Rossville office before . . .



and after modernization

The citizens of Rossville have entered whole heartedly into KP&L's development program. A spirit of cooperation has encompassed the town, and people who have never lifted a finger to work on other community activities are enthusiastically busy on this project.

A before-and-after film of Rossville's activities was prepared by one of its citizens.

Improvements included:

1. The city park was landscaped and equipped with tennis, croquet, and horseshoe courts; drinking fountain, and lights.

2. Store fronts were modernized.

3. Several churches were painted and their grounds landscaped.

4. Several homes were built and a home beautification campaign started.

5. A teen-age recreation club was formed.

6. A square dance club and a children's reading hour were started.

7. Highway signs and street markers were erected.

Twenty-one action committees are at work on future projects, some of which are: The conversion of a small grocery store into a new supermarket; widening main street and resurfacing all sidewalks; the installation of running water in every home, and the riddance of the town's eyesores—outhouses.

Although labor was donated for all of the projects the cost of materials mounted. Rossville solved its financial problems with community bingo parties, baseball games, and a rollicking Labor Day celebration.

Rossville's aggressive approach to community problems has made the town a gold mine of information for KP&L's pilot study.

Since the initiation of the pilot studies, KP&L's program has grown faster than Topsy, with 16 other towns actively participating and more towns requesting introductions to community planning. The success of the program far exceeds KP&L's expectations.

A Carbondale store as it was . . .

and as it looks today

Super power transformers pace utility expansion

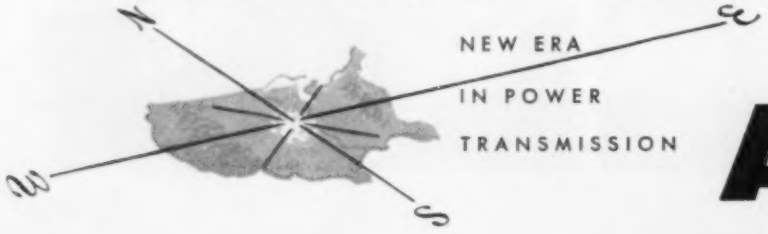
Highest rated transformer ever installed in U.S.

THIS is a 230,000-kva, three-phase power transformer, one of eight of this rating built by Allis-Chalmers to step up voltage for transmission from a steam generating station. Seven of the eight units have been shipped; the eighth will be shipped this year.

This enormous power transformer is an example of the record-breaking, trend-setting units built by Allis-Chalmers for power systems all over the country. Here are some of the features worth noting:

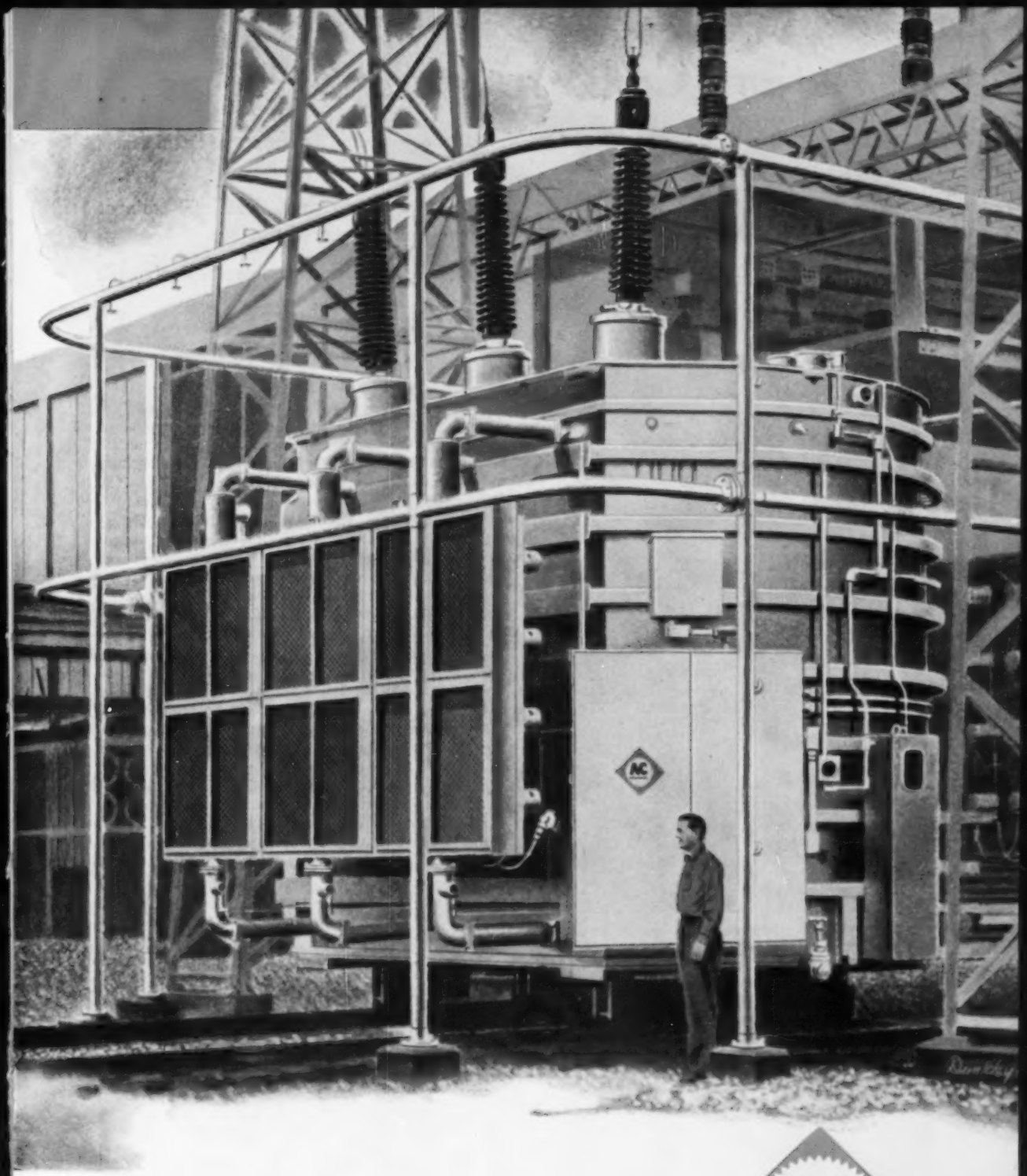
- Like all Allis-Chalmers power transformers, it is corona-free. Regardless of its tremendous size and great number of parts, the creeping deterioration of corona can never shorten this transformer's useful operating life.
- New aluminum welding techniques developed by Allis-Chalmers make this unit 15,000 pounds lighter than standard designs. Structural members are the same strength as before, but weigh far less, so that shipment and installation are easier.
- This transformer tested well below requirements specified for noise. One reason: the extra-quiet cooling system, using Allis-Chalmers developed *Electro-Coolers*. By increasing the number of fans and reducing the individual diameters of each fan, Allis-Chalmers engineers were able to reduce this source of noise significantly without impairing efficiency. Continuous noise research at Allis-Chalmers includes tests of completed transformers at a 10-acre outdoor proving ground where exact field conditions can be duplicated.

An Allis-Chalmers representative will be glad to discuss these and other transformer developments with you at your convenience. Call the nearby A-C office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4715



NEW ERA
IN POWER
TRANSMISSION

ALLIS-



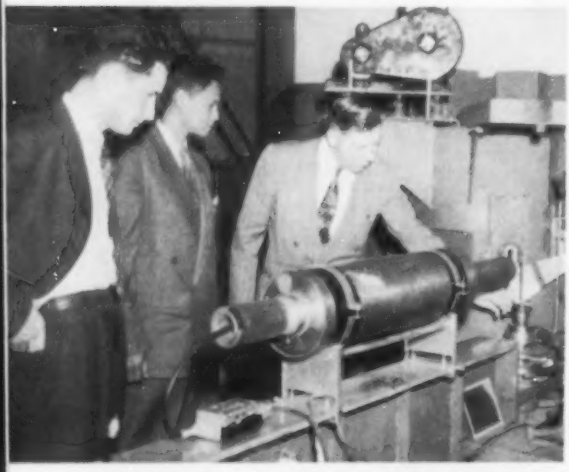
CHALMERS

A-C ALLIS-CHALMERS

General Machinery Division

19 Nations Come to Study Atom as . . .

TOUR OF REACTOR building was one of first assignments for students after arrival at Argonne school



NEUTRON CRYSTAL spectrometer is demonstrated to students from Argentina and Indonesia by instructor

. . . U.S. opens world's first international school of nuclear science

- **40 U.S. and foreign students will train at Argonne National Laboratory**
- **Project implements President Eisenhower's 'atoms for peace' program**

The world's first international school of nuclear science and engineering was opened at the Argonne National Laboratory, southwest of Chicago, on March 13. Thirty-one scientists and engineers from 19 nations throughout the western world gathered for a strenuous, seven-month schooling in the design, construction, and use of nuclear reactors for experimental or peacetime purposes. Joining them were nine scientists and engineers from the U.S., to bring the enrollment to 40.

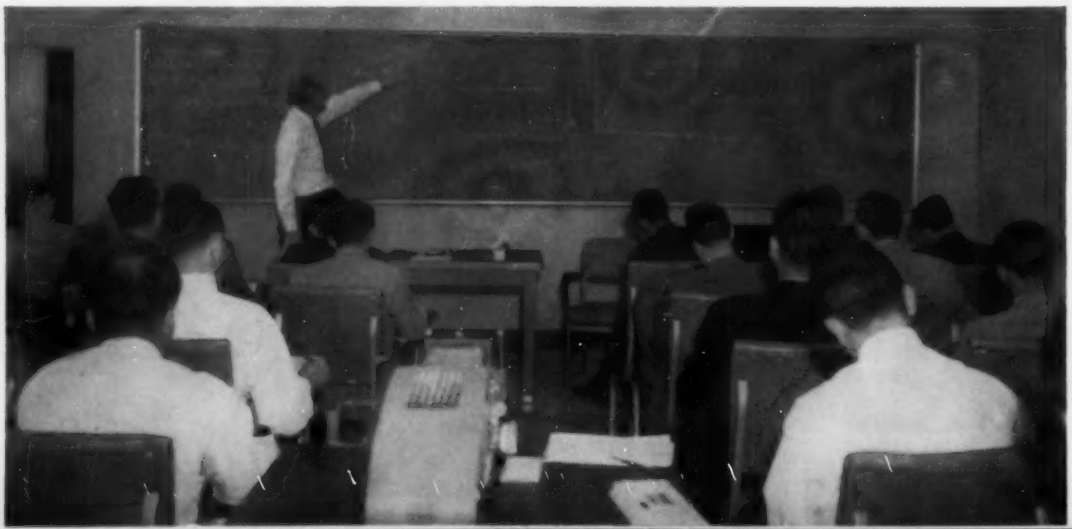
The project was undertaken by the Atomic Energy Commission in cooperation with the U.S. State Department and the Foreign Operations Administration in support of the President's "atoms for peace" program.

Director of the school is Dr Norman Hilberry, deputy director of the Argonne Laboratory. Dr J. Barton Hoag, on loan from the U. S. Coast Guard Academy, is serving as associate director.

"Courses have been planned to teach design, construction, and use of nuclear reactors for experimental or peacetime use only," said Dr Hoag. Emphasis will be placed on the practical rather than the theoretical aspects. There will be instruction in reactor engineering, reactor physics, chemistry, chemical engineering and metallurgy.

After four months of formal classes and laboratory work, where students receive a broadening of their own training, there will be three months of specialization during which time they will work out the design of reactors and equipment. They will do experimental work

CLASSROOM WORK will mark early part of the course, later work will stress laboratory and practical experience



CHANCELLOR KIMPTON, University of Chicago, speaking; others are W. H. Zinn, Argonne director, and AEC's W. K. Davis

which will be of greatest use to their countries in the future growth of peacetime uses of atomic energy.

Every student will be given laboratory work on Argonne's new research reactor, the CP-5. They will learn its parameters, its construction, and its constants.

An attempt will be made to give these students the scientific and technical knowledge of what has been declassified in the field of nuclear science. They will be given as much information in as much detail as possible. The facilities and instruction available at Argonne make it possible to give the students something they cannot get at home.

Other members of the school staff include:

Dr Stuart McLain, noted reactor engineer; Dr K. A. Varteressian, specialist in separation processes; Dr H. H. Chiswick, specialist in the metallurgy of uranium; and Dr J. J. Matz.

Fifty individual lecturers will come in to talk on their particular specialties.

The nine American students were sponsored by the companies for which they work. Students from other countries were sponsored by their respective governments.

The foreign countries represented are Argentina, Australia, Belgium, Brazil, Egypt, France, Greece, Guatemala, Indonesia, Israel, Japan, Mexico, Pakistan, Philippines, Portugal, Spain, Sweden, Switzerland, and Thailand.

Other classes are planned for the Argonne school. The second session is scheduled to open Nov. 7.

Training scientists in nuclear science has been a specialty at Argonne. When Westinghouse Electric Corp and E. I. du Pont Co needed trained technical personnel to cope with their large AEC contracts, it was Argonne which trained 250 of their employees. Since 1950, 49 graduate students, 54 faculty members of universities, and 52 scientists from private companies, not counting the Du Pont and Westinghouse trainees, have received in-service training at Argonne.

The U.S. does not propose to stop with the training of foreign students in the various phases of atomic energy (It will open another school May 2 at Oak Ridge, Tenn., in radioisotope techniques). The foreign countries will get materials to build reactors and start atom industries.

MASTER SLAVE manipulator for handling "hot" materials in shielded area is explained by Dr R. C. Goertz

IN REACTOR control room, Octave J. Daniel of Argonne explains dials to students from Belgium and Egypt

Waste Disposal Curbs Nuclear Plants

- **Waste disposal problem is one of the limiting factors in nuclear power plants**
- **Other problems hinge on safety; human element may be biggest hazard**
- **Uranium deposits will be ample, if demand makes low grade ore economical**

Limiting factor in the future use of nuclear power plants is the waste disposal problem. The ideal solution must lie outside any ideas currently contemplated. Present methods are only temporary expedients.

This prediction and appraisal of present waste disposal methods were sounded by Dr G. T. Seaborg, professor of chemistry, University of California, at a conference jointly sponsored by Stanford Research Institute and Atomic Industrial Forum, Inc, in San Francisco, April 4-5. His views were seconded by Dr W. C. Rueckel, vice president, Kaiser Engineers.

The dual-cycle boiling water reactor to be used in the 180,000-kw nuclear plant proposed by the Nuclear Power Group was described by Samuel Untermyer II, General Electric Co. It offers increased thermal efficiency over a reactor utilizing an intermediate heat exchanger. The dual-cycle design also offers a low reactor pressure, greater inherent safety of operation, flexibility in load range, and self-stabilizing characteristics to meet instantaneous load changes. Installed cost of the plant would be $200 to $270 per net kw, exclusive of land charges. But, said Untermyer, the inherent safety of the design would lessen the need for a large site.

Dr Edward Teller, professor of physics, University of California, emphasized that a major catastrophe in a nuclear plant cannot produce any amount of energy comparable to an atomic bomb explosion. The real danger lies in the propagation of nuclear poisons throughout the adjacent area. He, therefore, urged engineers to design units that shut down if they begin to produce more energy than they are designed for. Handling the worst possible accident that could occur should also be reflected in design of a reactor and its structures.

Even the remotest contingency, such as an earthquake in unlikely parts of the country, must be considered. Teller felt the human element will be the greatest hazard in the operation of nuclear power plants. Consideration should be given to cumulative violations of safety practices by humans that would cause worst possible accident.

Uranium Costs . . . Methods are now available for extracting uranium from very low-grade sources at costs which may not be prohibitive for the nuclear power industry of the future, explained J. C. Johnson, Atomic Energy Commission Division of Raw Materials.

For costs up to $12 per lb of uranium oxide, the price engineers use at present in estimating power costs, production undoubtedly will supply the power industry for many years, he said. Beyond 1980, uranium resources can be expanded greatly by considering a range of $12 to $30 per lb. If the cost goes to $50, vast low-grade deposits would provide many million tons of uranium oxide.

In companion papers, C. C. Whelchel, chief mechanical engineer, Pacific Gas & Electric Co, and J. N. Landis, vice president, Bechtel Corp, pointed up future operating, maintenance, and design criteria to be applied to nuclear plants.

Sodium Graphite Reactor . . . Two important contributions have come from the experimental sodium graphite reactor now under construction at Santa Susana, Calif., reported Sidney Siegel, assistant manager, nuclear engineering and manufacturing department, North American Aviation Co. Tests indicate a mechanical centrifugal pump will be an economical solution for the pumping of liquid sodium. The pump uses a frozen sodium shaft seal and an external casing seal. A full-scale mock-up of the reactor's fuel handling system has provided valuable information on mechanical components, gas locks, and cleaning system.

INTERNATIONAL EFFECT of nuclear energy is discussed by M. Patterson, U. S. member for international atomic energy negotiations. Looking on at right are J. E. Hobson, SRI director, and W. L. Cisler, president, Detroit Edison and AIF

L-M's new Luminaire Supports will hold a 250-pound man!

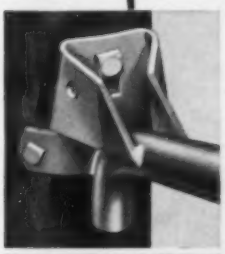
Here's the first complete line of brackets designed specifically to meet customers' requirements for strength, *minimum pole space* (less than the rise of the bracket), and handsome appearance.

Obviously we didn't design them for a gymnasium—but they *are* strong enough so that even the extra-long 20-footers will support a 250-pound man, if he should accidentally put his weight on the end of the arm. Pole plates and tension support members are all welded to the unit to insure ample strength throughout the entire assembly. These designs have all been wind-tunnel-tested for winds up to 150 MPH to assure generous lateral strength.

Pole space required is only one inch per foot of bracket length—except on A-frame brackets, which require not over 1.6 inches per foot. In other words, a 10-foot bracket requires only 10 inches of pole space. The 20-foot A-frame bracket shown above requires only 30 inches of pole space. Installation instructions are marked directly on the support arm.

Units are easy to handle, install, and wire. The entire line is related in appearance so that you can use several types in the same installation, if desired. All types are available in galvanized steel or aluminum; choice of plain, threaded, or street-ell end styles.

Four harmonizing styles of supports, available in various lengths up to 20 feet, in steel or aluminum. Get details on sizes available in each style.



Upper photo: Strong pole fitting has ample strength; held by ⅝-inch thru-bolt and 2½-inch lag screws. Lower: welded support for braces adds strength, minimizes vibration.

Get Complete Information on L-M Street Lighting Application Service

These are the only brackets that have all three advantages—extra strength, minimum pole space, and handsome design. L-M also offers a full line of street lighting luminaires—incandescent, mercury vapor, and fluorescent—and complete street lighting application engineering service. Ask the L-M Field Engineer for information and bulletins. Or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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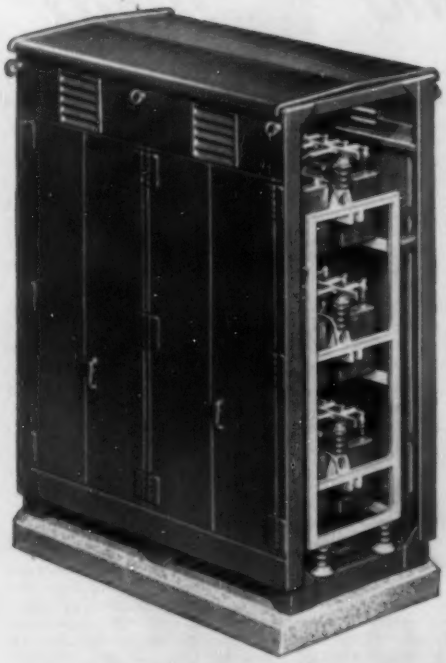
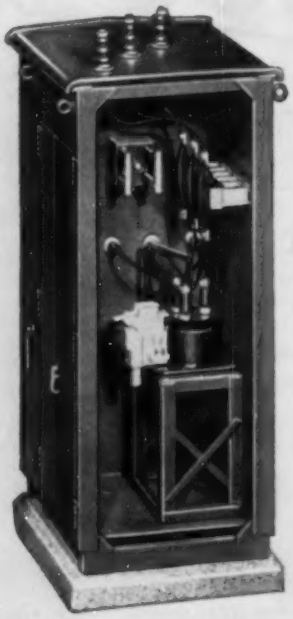
LINE MATERIAL
Street Lighting

Scale models of L-M Metal-Enclosed Capacitor Equipments. At extreme right is control compartment; next, the oil circuit breaker compartment; center, an 1800 kvar compartment with doors opened to show Elemex individually fused capacitors in racks.

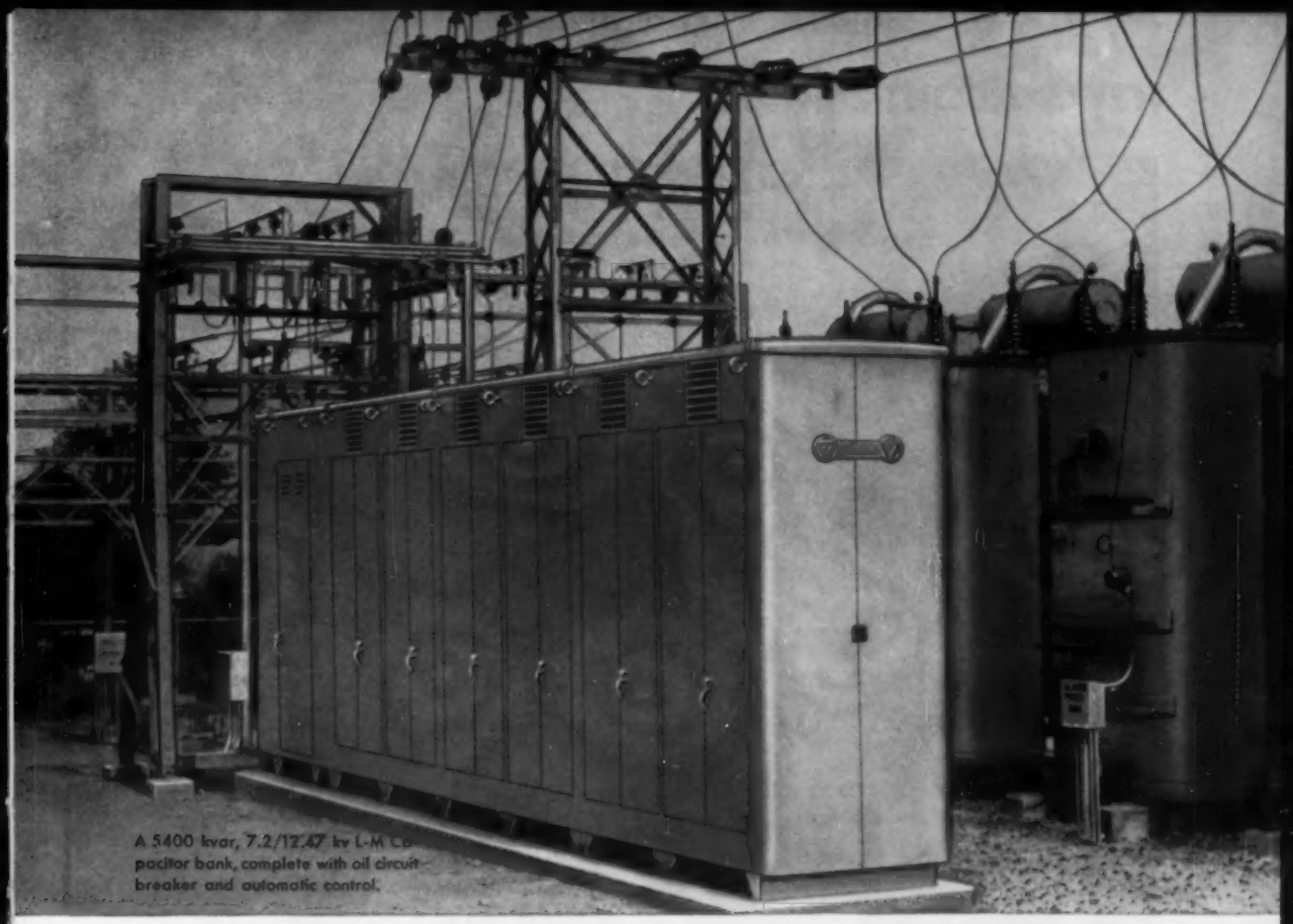


Scale model of an 1800 kvar capacitor compartment, showing how capacitor units and fuses are mounted on insulated inner rack behind interlocked doors.



Typical oil circuit breaker compartment includes breaker, current and potential transformers, and accessories.

Typical control panel with overcurrent relays, ammeters, recording voltmeter, voltage control, and other necessary relays and control switches.



A 5400 kvar, 7.2/12.47 kv L-M Capacitor bank, complete with oil circuit breaker and automatic control.

L-M's Metal-Enclosed Capacitor Equipments Provide Wide Choice of Sizes and Arrangements

by **N. K. DELANEY**
Manager of Capacitor Sales
Line Material Company

L-M's Metal-Enclosed Capacitor Equipments provide a self-contained three-phase bank with or without switching equipment and complete controls. The assembly makes a neat-appearing installation; is extremely compact; and provides a high degree of safety, because no live parts are accessible except through doors which are interlocked with the short-circuiting and grounding switch.

L-M's Metal-Enclosed Capacitor Equipments provide wide flexibility. All control equipment is in one compartment. A second compartment contains the circuit breaker, current and potential transformers, and short-circuiting and grounding switch.

Capacitor compartments contain racks of Elemex capacitors. Sizes range from 600 to 1800 kvar, and voltages from 2400 to 13,800. These compartments are provided with thermostatically controlled cooling fans, and doors interlocked with the grounding switch. Equipments are exceptionally rigid, heavy steel, completely finished for long protection against weather. All capacitors have individual bus-mounted flameless fuses with indicating feature. A variety of convenient accessories is available. Connections may be underground through potheads, or to bushings at top of breaker or power entrance compartment.

Get The Details

Ask the L-M Field Engineer for complete information about L-M Metal-Enclosed Capacitor Equipments and about L-M's Complete Capacitor Application Engineering Service. Or write Line Material Co., Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Sizes and Ratings Available

L-M Metal-Enclosed Capacitor Equipments are available in the following NEMA-standard ratings:

2400/4160 volts: 600, 900, 1200, 1800, 2700, and 3600 kvar.

4800, 7200, 12,470, and 13,800 volts: 900, 1800, 2700, 3600, 4500, and 5400 kvar.

In 5 kv class equipments the capacitor compartments are in 600, 900, 1200, and 1800 kvar sizes.

In 8.7 and 15 kv class equipments standard compartment sizes are 900 and 1800 kvar.

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LINE MATERIAL *Elemex® Capacitors*

CILCo Elects Babcock VP

William W. Babcock, with Central Illinois Light Co, Peoria, for 23 years, has been elected a vice president. He will be in charge of sales, public relations, and rates, succeeding Vice President Roy K. Dallas who has been placed in charge of rate research.

After his graduation as a mechanical engineer from Clarkson College in Potsdam, N. Y., Babcock worked with General Electric Co and with Ohio Edison Co. He joined Central Illinois Light in 1932 as efficiency engineer at the Liberty Street power and heating plant. Later, he became assistant operating mechanical engineer.

In 1940 Babcock was named superintendent of power and in 1951 assistant to the vice president of sales, public relations and rates.

W. W. BABCOCK

West Penn Power's New VP

West Penn Power Co has named Eugene Gordon as vice president to succeed William V. Drake, who has retired after 34 years with the utility and affiliated companies.

Gordon, elected to head the power department at West Penn Power, resigned as vice president of Potomac Edison Co to accept the new post. Both companies are subsidiaries of West Penn Electric Co.

In his 32 years with Potomac Edison, Gordon served as chief engineer and plant superintendent at the Williamsport (Md.) station, superintendent of power, superintendent of power stations, manager of power production, and vice president. He has been on loan to West Penn Power for the past ten months as acting manager of the power department.

E. GORDON

PERSONAL BRIEFS

CP&L, Tampa Electric

Dwight Carlsen, organizer of Central Power & Light Co's advertising department, recently was elected as treasurer of the Corpus Christi, Tex., utility. He has been succeeded as the firm's advertising manager by **Maurice Gardner,** who has had 11 years experience in the department . . . **W. C. Fitkin,** chairman of the board and president of both National Gas & Oil Corp and Michigan Gas Utilities Co, has been elected a director of Tampa (Fla.) Electric Co.

Ohio PUC

Ohio's Public Utilities Commission has appointed **Edward J. Kenealy** to serve a six-year term as a commission member. Kenealy, an electrical engineer, has been with City of Cleveland's public utility operation for 30 years.

Black Hills P&L

Black Hills Power & Light Co has announced the retirement of **B. B. Neel,** financial vice president of the utility since last April, after 30 years in the electric industry.

Paul R. Grossman has been appointed director of research of Babcock & Wilcox Co. Since 1954, Grossman has been chief research engineer at B&W's research center in Alliance, Ohio.

Westinghouse Electric Corp has named **Arthur G. Tichenor,** with the company since 1954, as manager of manufacturing, Industrial Products Division.

Ray V. Nuss has been promoted from assistant construction superintendent-lines to construction superintendent-lines of Pennsylvania Power & Light Co, succeeding **Austin B. Kilgo.**

Leonard L. Youell has been appointed vice president and general manager of Stone & Webster Canada, Ltd, with

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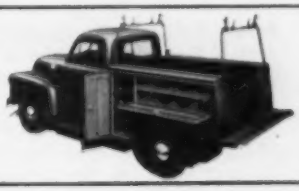
The 1 Source
for utility bodies and equipment!

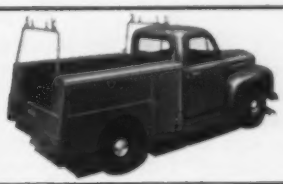
If your work calls for one service body or a hundred . . . if you can use standardized units or require custom-made equipment . . . you'll find a body to fit your needs in the Powers-American line. Ladders, reels, racks, hooks, brackets, shelves, and other special items of equipment, can be furnished for your particular work requirements.

May we help you with your service body problems? Complete details will be sent upon request.

Series 44L and Series 44 (shown above) designed for any general service work. Fully-equipped with shelves and bins. For ½, ¾, 1, and 1½ ton chassis.

Series 25T and 35T arranged for telephone installation and service. Widely used in other phases of utility work. Available in ½ and ¾ ton sizes.





Series 25M and 35M used for all types of general service. Especially suitable for electric meter installation and maintenance. Models for ½ ton and ¾ ton vehicles.

Series 25G and 35G designed for use in the installation and servicing of gas meters. Equipped with meter hold-downs, bins, and pipe rack. In ½ and ¾ ton sizes.

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McCABE-POWERS AUTO BODY COMPANY

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(*Continued from page* 36)
headquarters in Toronto. He has been with the company for ten years . . . Recent reorganization of senior management and engineering group of Hydro-Electric Power Commission of Ontario has placed **A. W. Manby,** general manager, in charge of overall administration of commission affairs and has made **Dr Otto Holden,** chief engineer, directly responsible to commission for completion of Niagara and St. Lawrence power projects.

Wisconsin Public Service Corp has announced the election of **L. G. Roemer,** treasurer, as a director. He has been with the company 25 years.

OBITUARY

W. A. Roberts, 57, president of Allis-Chalmers Manufacturing Co since February, 1951, died April 12 following a heart attack. Beginning his career with Allis-Chalmers in 1924 as a salesman for the firm's tractor branch in Wichita, Kans., Roberts worked his way through several promotions to become general sales manager of the Tractor Division in 1931. He became vice president in charge of the division in 1944 and was elevated to executive vice president in 1947.

Joseph Urich Diehl, 58, vice president of Pennsylvania Water & Power Co for the past eight years, died at his home in Wilmington, Del., April 12. He had been associated with the utility and its affiliate, Safe Harbor Water Power Corp, for 24 years.

Charles Otto Lenz, 86, a leading consultant engineer in the fields of steam and atomic power, died April 8 in Summit, N. J. Until recently he was associated with Gibbs & Hill, Inc, a New York engineering firm, acting as consultant to the Atomic Energy Commission on its Savannah River steam plant development.

E. E. Spracklen, 62, consultant engineer with Empire District Electric Co and formerly the utility's superintendent of distribution and transmission, died April 1 in Joplin, Mo.

J. Osborne Hopwood, 75, director of personnel for Philadelphia Electric Co before his retirement in 1950, died April 4.

EEI Convention Spotlights . . .

. . . nuclear energy, western power development, and free enterprise in Los Angeles, June 13-16. Dixon, Hafstad to speak

Development of the peacetime atom for a nuclear-powered future will occupy the spotlight for a full day of general sessions at the 23rd annual convention of Edison Electric Institute in Los Angeles, June 13-16. All of the convention's five sessions will be held in Philharmonic Auditorium.

Presentation of the atomic energy picture, sketched in the electric utility perspective, will include a discussion by Edgar H. Dixon, president of Middle South Utilities, Inc, New York, and chairman of EEI committee on atomic energy. He will give a survey of the electric industry's response to nuclear power—what the industry has done and what it is expected to do.

Dr Lawrence R. Hafstad, director of Atomic Energy Division of the Chase National Bank of the City of New York, will base his speech, titled "Atomic Energy and the Electric Utilities," on the premise that "nuclear energy will find its most practical and profitable use in the production of electricity."

"The Economics of Feed Materials and Fuel Processing Problems," will be considered by J. Carlton Ward, Jr, president of Vitro Corp of America. He will concentrate on power production through nuclear reactors.

First A-Power Plant . . . Philip A. Fleger, chairman of the board of Duquesne Light Co, Pittsburgh, will describe the Shippingport, Pa., atomic plant, the first full-scale, nuclear-fueled power plant in America.

EEI President Harold Quinton, in his address following a welcome from California Gov Goodwin J. Knight, will accent the challenges for the electrical industry to maintain its record of achievement, to set new standards, and to fight for economic freedom.

The struggle of free enterprise versus government regulation will be more deeply explored by Richard Joyce Smith, partner of Whitman, Ransom & Coulson, New York, and H. C. McClellan, chairman of National Association of Manufacturers and president of Old Colony Paint & Chemical Co.

Dr George C. S. Benson, president of Claremon Men's College, Claremont, Calif., will give a broad view of the problem with his discussion, "Is the Federal Government Taking Over the States."

To strengthen the case for free enterprise, Louis V. Sutton, president and general manager of Carolina Power & Light Co, and Philip Sporn, president of American Gas & Electric Co, will offer a review of past achievements of the electrical industry.

With another approving look at the past, R. G. Rincliffe, president of Philadelphia Electric Co, will outline power generation growth, accenting PEC's new super-critical station.

Regional Spotlight . . . The regional spotlight for the convention, appropriately, will be turned on the West. "Far Western Growth Makes Utility History" will be the topic explored by James B. Black, president of Pacific Gas and Electric Co.

Focus will be sharpened on the Northwest by Kinsey M. Robinson, president of Washington Water Power Co, Spokane, when he sizes up "Electric Utility Problems in the Pacific Northwest."

Other speakers will be C. A. Tatum, Jr, president and general manager of Dallas Power & Light Co; and Elmer L. Lindseth, president of Cleveland Electric Illuminating Co.

A highlight of the regular convention sessions will be the awards presentation by Harry Restofski, vice president of West Penn Power Co and chairman of EEI prize awards committee. The Charles E. Coffin Award will be among those presented.

After session hours, convention delegates will be offered a change of pace with a reception-dance on June 13 and a Hollywood star-sparked musical review on the Paramount Theater stage on June 15. In addition, two daylight tours into Hollywood and Beverly Hills will be sponsored for the delegates' ladies.

Unconventional Daily, containing reports of the general sessions as well as a roster of registrants, official notices, and other news, will be published by Electrical World.

for the loads of the future...

something NEW has been added

to the Sangamo J2–the meter of the future!

If you are adding to your customers' kwh consumption through load-building programs . . . through the promotion of adequate wiring . . . and if you are concerned about meter reading costs, you may be interested to know that *something new has been added to the Sangamo J2 Watthour Meter.*

The "something new" is an extra circle the same size as on 4-circle registers. This new 5-circle register practically guarantees *no register turn-over on big loads—even with extended reading periods.* And it's optional at no extra cost.

If you would like to see for yourself how efficiently designed this new register is, we'll gladly send you a standard production Sangamo 5-circle register. Just fill out the coupon below and mail it today.

the FIRST watthour meter with straight line accuracy up to 100 amperes!

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Hydraulically Operated Circuit Breaker

THIS Allis-Chalmers circuit breaker is now installed on a Western power system. It is rated 230 kv, 10,000,000-kva interrupting capacity.

The *Pneu-Draulic* operator used on this breaker is of the same basic design as those used on operators for Allis-Chalmers breakers from 13.8 kv up, and 500,000-kva to 10,000,000-kva interrupting.

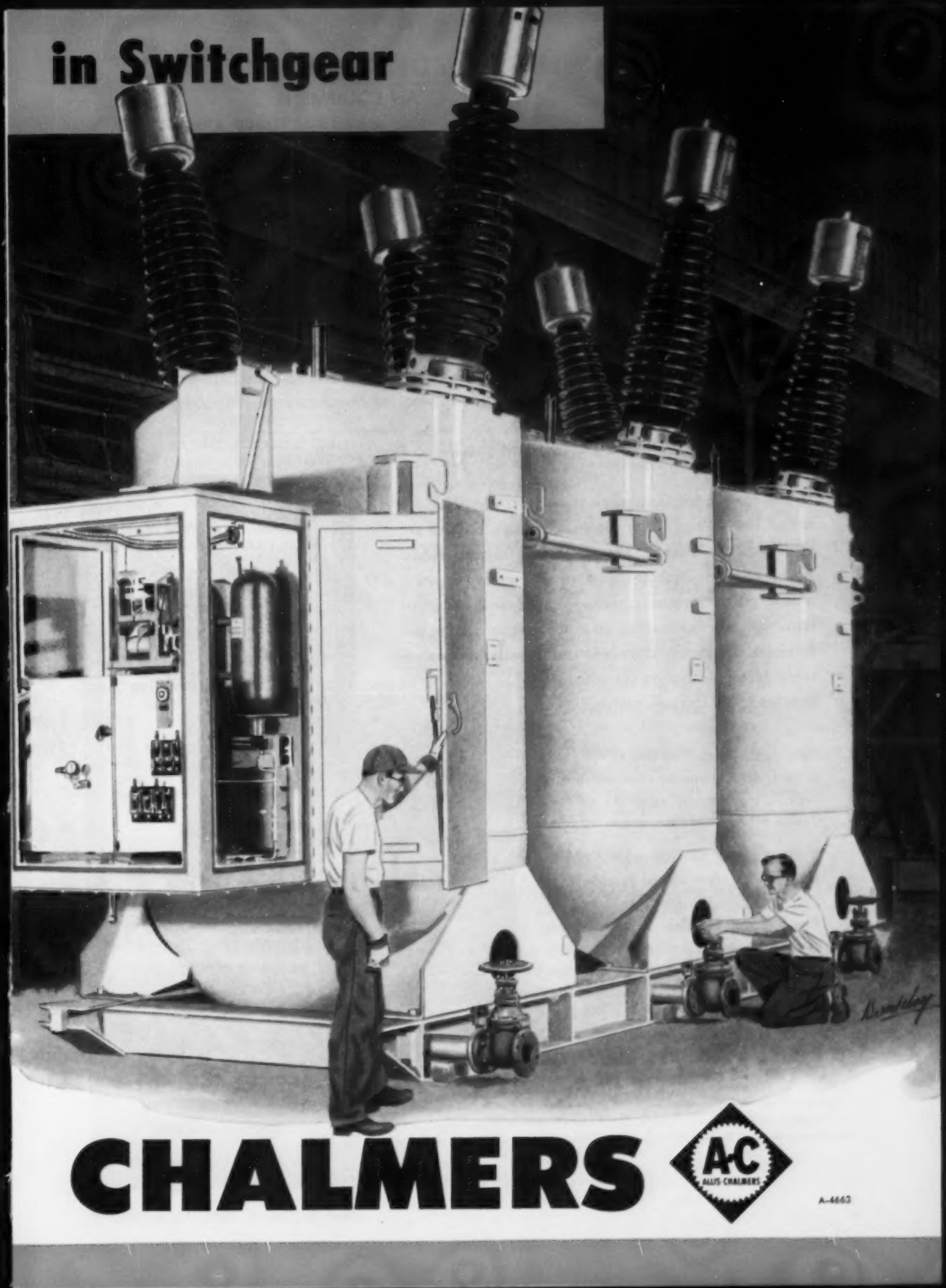
With the *Pneu-Draulic* operator even this enormous circuit breaker can be closed at full-rated speed under emergency conditions without use of control power. One man using one hand can easily pump up sufficient pressure in less than a minute for full-speed closing.

And it is perfectly safe to do this only because the operating mechanism is *mechanically trip-free.* Allis-Chalmers alone builds *all* breakers mechanically trip-free.

GET COMPLETE INFORMATION: Call your nearby A-C office or write Allis-Chalmers, General Machinery Division, Milwaukee 1, Wisconsin.

Pneu-Draulic is an Allis-Chalmers trademark.

ALLIS-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Specify standard Pinco Bushings. The two Bushings shown here, are typical of the many standard types available in the Pinco line.

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Refer to Pinco catalog No. 49 for complete specifications on standard bushings . . . or contact us or the nearest Joslyn office.

IF YOU REQUIRE "CUSTOM-MADE" PORCELAIN . . . we are equipped to make it to your exact specifications. Quotations on Pinco special porcelain are made from your blue print or sketch. And if you wish, our engineering department will assist you in designing the porcelain you require.

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SPECIFICATIONS
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Clamp Range ..... .375 Min.
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Ampere Rating ..... 400 Amp.
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MEETINGS CALENDAR

APRIL

ILLUMINATING ENGINEERING SOCIETY—Pacific Northwest Regional Conference, Harrison Springs Hotel, Harrison Hot Springs, B. C., April 24-27.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Region VIII Meeting, Rice Hotel, Houston, Tex., April 25-26.

EDISON ELECTRIC INSTITUTE—Hydraulic Power Committee, Atlanta-Biltmore Hotel, Atlanta, Ga., April 25-26; EEI-AGA 1955 National Conference of Electric and Gas Utility Accountants, Conrad Hilton Hotel, Chicago, April 25-27; Meter and Service Committee, Washington-Duke Hotel, Durham, N. C., April 25-27.

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS—8th Annual Conference for Protective Relay Engineers, Sponsored by Department of Electrical Engineering, College Station, Tex., April 25-27.

NORTH CENTRAL ELECTRIC ASSOCIATION—Engineering Committee, Dyckman Hotel, Minneapolis, April 25-28.

NATIONAL INDUSTRIAL CONFERENCE BOARD—Atomic Energy Course for Management, New York, April 25-30.

PENNSYLVANIA ELECTRIC ASSOCITION—Spring Meeting, Meter Committee, Washington-Duke Hotel, Durham, N. C., April 28-29.

CONTROLLERS INSTITUTE OF AMERICA—Eastern Conference, Royal York Hotel, Toronto, Ont., April 28-30.

MAY

ILLUMINATING ENGINEERING SOCIETY—Midwestern Regional Conference, Edgewater Beach Hotel, Chicago, May 2-3; Canadian Region, Mount Royal Hotel, Montreal, May 12-13; East Central Region, Abraham Lincoln Hotel, Reading, Pa. May 19-20.

RURAL ELECTRIFICATION ADMINISTRATION—6th Annual Operations & Maintenance Conference, Shirley-Savoy Hotel, Denver, May 2-5.

***EDISON ELECTRIC INSTITUTE**—Transmission and Distribution Committee, Statler Hotel, Detroit, May 3-4; Spring Meeting, Purchasing and Stores, Dinkler Tutwiler Hotel, Birmingham, Ala., May 8-11; Prime Movers Committee, Biltmore Hotel, Los Angeles, May 9-10; Accident Prevention Committee, Pfister Hotel, Milwaukee, Wis., May 9-10; Commercial Electric Cooking Conference, Sheraton Hotel, Chicago, May 10; Electrical Equipment Committee, Rice Hotel, Houston, Tex., May 16-17; Industrial Relations Committee jointly with Personnel Administration Section, Southeastern Electric Exchange, Netherlands Plaza Hotel, Cincinnati, May 19-20; Dealer Coordination Workshop, Webster Hall Hotel, Pittsburgh, Pa., May 19-20.

AMERICAN PUBLIC POWER ASSOCIATION—Annual Meeting, Jacksonville, Fla., May 3-5.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Middle Eastern District No. 2, Columbus, May 4-6; Electric Heating Conference, La Salle Hotel, Chicago, May 10-11.

NATIONAL ASSOCIATION OF ELECTRIC COMPANIES—Annual Meeting, Mayflower Hotel, Washington, D. C., May 5.

***PENNSYLVANIA ELECTRIC ASSOCIATION**—Spring Meeting, Transmission and Distribution Committee, Irem Temple County Club, Dallas, Pa., May 5-6; Spring Meeting, Hydaulic Power Committee, Hotel Sheraton-Brock, Niagara Falls, Ont., May 5-7; Spring Meeting, Systems Operation Committee, Skytop Lodge, Skytop, Pa., May 12-13; Spring Meeting, Electrical Equipment Committee, Hotel Roosevelt, Pittsburgh, May 19-20; 1955 Annual Industrial Sales Conference, Bedford Springs Hotel, Bedford, Pa., May 19-20; Annual Accounting Conference, William Penn Hotel, Pittsburgh, May 23-24; Spring Meeting, Relay Committee, Abraham Lincoln Hotel, Reading, Pa., May 26-27.

WISCONSIN UTILITIES ASSOCIATION—Home Service Conference, Edgewater Hotel, Madison, May 5-6.

***NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION**—Business Development Section, Hotel Utah, Salt Lake City, May 9-11.

***ELECTRIC COMPANIES ADVERTISING PROGRAM**—Copy Group, Hotel Sheraton, Chicago, May 10.

***PACIFIC COAST ELECTRICAL ASSOCIATION**—Annual Convention, Palace Hotel, San Francisco, May 11-13.

PUBLIC UTILITIES ADVERTISING ASSOCIATION—34th Convention, Sheaton Hotel, Chicago, May 11-13.

NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS—Annual Convention, Commodore Hotel, New York, May 12-14.

***NORTHWEST PUBLIC POWER ASSOCIATION**—Engineering and Operations Section, Monticello Hotel, Longview, Washington, May 19-20.

INTERSTATE POWER CLUB—General Electric Co Wire and Cable Plant, Bridgeport, Conn., May 20.

***NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS**—47th Annual Convention, Conrad Hilton Hotel, Chicago, May 22-25.

***NORTH CENTRAL ELECTRICAL ASSOCIATION**—Accounting Committee, Fergus Falls, Minn., May 27-28.

JUNE

AMERICAN WELDING SOCIETY—Spring Meeting and Welding Show, Hotel Muehlebach, Kansas City, Mo., June 7-10.

***AMERICAN SOCIETY OF MECHANICAL ENGINEERS**—Oil and Gas Power Conference, Statler Hotel, Washington, D. C., June 5-10.

***ELECTRIC COMPANIES ADVERTISING PROGRAM**—Management Group, Statler Hotel, Los Angeles, Calif., June 12.

EDISON ELECTRIC INSTITUTE—23rd Annual Convention, Los Angeles, Calif., June 13-16.

AMERICAN SOCIETY FOR ENGINEERING EDUCATION—63rd Annual Meeting, Pennsylvania State University, State College, Pa., June 20-24.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION—Accounting and Business Practice Section, Vancouver Hotel, Vancouver, B. C., June 22-24.

***WISCONSIN UTILITIES ASSOCIATION**—Accounting Section, Dell View Hotel, Lake Delton, Wis., June 26-28.

***MICHIGAN ELECTRIC ASSOCIATION**—Annual Convention, Grand Hotel, Mackinac Island, Mich., June 26-29.

AMERICAN SOCIETY OF TESTING MATERIALS—1955 Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-July 1.

* **CANADIAN ELECTRICAL ASSOCIATION**—Annual Convention, Hotel Vancouver, Vancouver, B. C., June 27-29.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Summer General Meeting, New Ocean House, Swampscott, Mass., June 27-July 1.

* Additions this week.

DRILLING RIG (above) is anchored at 725,000-kw site of Pleasant Valley Dam, one of two proposed by Pacific Northwest Power to up area's supply 1 million kw

Snake River Dam Tests Start

Mountain Sheep and Pleasant Valley Dams on the Snake River will produce 1,025,000 kw of power, Kinsey M. Robinson, president of the Pacific Northwest Power Co, has revealed. The two sites originally had been expected to turn out about 800,000 kw.

Robinson forecast that PNP will file by next September for a license to build the two dams from the Federal Power Commission. PNP has been given a three-year preliminary permit by FPC to investigate the site for the two proposed projects on the Oregon-Idaho border.

The total cost of building the two dams, including transmission facilities, has been estimated at $200 million.

Field Tests Under Way . . . Robinson said that more than $1 million is being spent in preliminary engineering. Field engineering tests are under way from two camps, one at Dug Bar, a short distance upstream from Mountain Sheep site, and the other at Pittsburg Landing above the site of the Pleasant Valley Dam.

Surveys indicate that the Mountain Sheep Dam will be 233 ft high, producing 300,000 kw, and Pleasant Valley will be 492 ft high, producing 725,000 kw. In a 20-mile stretch of the middle Snake below Hells Canyon, the two dams will drop water 538 ft.

Both dams will be upstream from the mouths of the Salmon and Imnaha Rivers and will not interfere with salmon spawning in these tributaries.

Engineering studies at the sites, including core drillings, are directed jointly by Bechtel Corp. and Ebasco Services, Inc. The Morrison-Knudson Co has built access roads around the sites under permits from the U. S. Forest Service. Part of the materials and supplies for engineering camps comes over the roads and part by Diesel-powered river boats from Lewiston, Idaho.

The PNP company consists of the Washington Water Power, Portland General Electric, Pacific Power & Light and Montana Power Companies.

"We in private power companies believe there is a place for federal, public and private agencies in Northwest power development," says Robinson. "The Northwest Power Pool has a national name and is a model of partnership operation among all power interests.

"Now the Mountain Sheep and Pleasant Valley developments, done under private financing, are two more contributions by private enterprise to the growing power needs of the region. These are in harmony with President Eisenhower's partnership program."

First St. Lawrence Power Sought by Four Buyers

Four prospective buyers have submitted contracts to purchase almost half of the first 700,000 kw of United States power to be produced in 1959 by the joint U. S.-Canadian project on the St. Lawrence River.

New York State Power Authority, in charge of construction and operation for U. S. power share, announced that contracts, with specified kilowatts desired, had been received from the following:

Aluminum Co of America, 174,000 kw to be increased to 239,000 kw as more energy becomes available, for its Massena (N. Y.) plant; Vermont's State Public Service Commission, 100,000 kw, for allocation among utilities and electric co-operatives in the state; the City of Plattsburg, 30,000, for area consumption; and the United States Air Force, 10,000 kw, for its Plattsburg base.

To consider the proposed contracts, the State Power Authority has called a public hearing on May 10 at New York City Hall. The four prospective buyers will pay 2.67 mills per kwhr. Alcoa's contract runs to the year 2003; the others to mid-1980. All must be approved by the Power Authority and New York's Gov Averell Harriman.

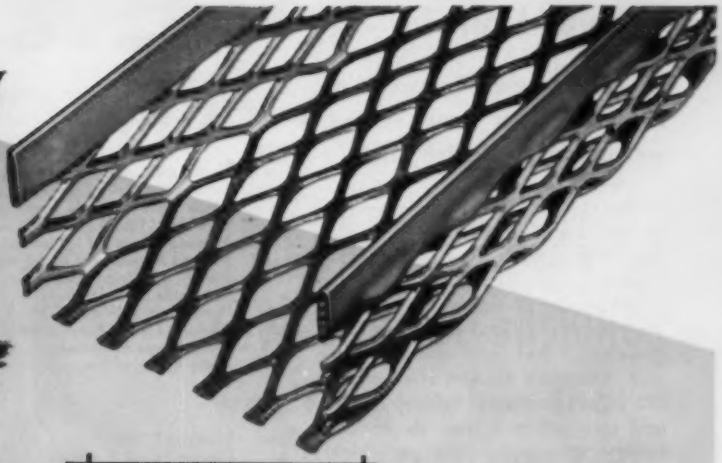
The St. Lawrence development is being constructed jointly by New York's Power Authority and Ontario Hydro Electric Power Commission at an estimated cost of $562 million. It will consist of three dams, a powerhouse on the international boundary near Cornwallis, Ont., and Messena, and 16 turbine generators operating on either side of the boundary.

Each of the two countries will receive half of the total output, estimated at 700,000 kw firm capacity for each with full operation. First power deliveries are scheduled for 1958, and completion date for the entire project has been set a year later.

Push Dalles Dam Work

Construction of the $300-million Dalles Dam passed a milestone last month when the one-millionth cubic yard of concrete was poured for the Columbia River project. It will require approximately a million more cubic yards for completion.

NEW



DELTA-STAR Uni-Tray Cableways
for control and power cables, instrument piping

Delta-Star's new UNI-TRAY expanded metal cableways offer you *improved* support for your control and power cables, and instrument piping.

The complete UNI-TRAY system provides standard fittings for any change of direction or offset in either horizontal or vertical plane—all fittings needed to erect a complete "customized" installation. Covers are also available.

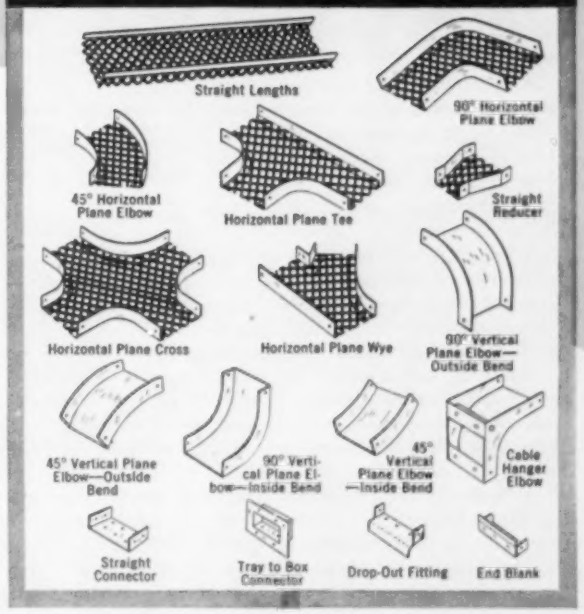
Sections are made of durable, non-corroding expanded metal—a choice of standard hot galvanized steel or aluminum. Expanded metal improves the current rating of conductors, prevents collection of water and dirt, is lightweight and strong.

Installation is simple, requiring only the use of nuts, bolts and a wrench.

The same exacting engineering, skilled workmanship and quality materials for which DELTA-STAR is famous go into UNI-TRAY Cableways. That's why you can depend on UNI-TRAYS to deliver best possible performance.

For complete information, see your nearby DELTA-STAR representative. Or, write for Bulletin 68.

Meet all your requirements with UNI-TRAY



For the best in electrical equipment—specify DELTA-STAR

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OF PITTSBURGH
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Hoover Unit . . .

. . . recommends Samson-trim for FPC, other agencies but members shun Delilah role

The Hoover Commission proposes to trim the judicial functions of the Federal Power Commission and other regulatory agencies.

Publication of the new report, on government's "Legal Services and Procedure," had only moderate impact. Chairman Herbert Hoover and five other commission members withheld their approval from the revolutionary recommendations to shrink authority of the independent agencies. Significantly those who joined Hoover in the "silent dissent" included the Administration's two top spokesmen in the commission—Attorney General Herbert Brownell, Jr, and Defense Mobilizer Arthur S. Flemming.

Among the controversial recommendations were these:

- Relinquishment of federal jurisdiction to state agencies wherever possible.
- Concentration of remaining federal authority over the same subject to a single agency, or combining federal agencies into commissions with specialized regulatory sections.
- Reduction of agency authorities in license revocation.
- Statutory requirement for speedy disposition of cases in controversy.
- Judicial review should be available in any case where it is not specifically precluded by congressional act.
- Agency action should be based on positive statutory authority and, conversely, should not be recognized "merely because (it) is not contrary to the specific provisions of a statute."
- Injunctive relief in outside courts should be available to halt any agency proceeding or action at any stage upon a showing that it is "clearly in excess of constitutional or statutory authority" and respondent individual or company should be entitled to damages in sum of costs, attorney's fees.

Formal dissents came from Democratic Rep Chet Holifield and Republican Rep Clarence J. Brown, both commission members. Combined with "silent dissents," they make the document, as it relates to the agency power, apparently good only for academic discussion.

Changes in Capacity Reported to FPC

PLANT ADDITIONS DURING FEBRUARY

State	Utility	Plant	Fuel	Capacity (Kw)
Vt.	Swanton Electric Light Dept	Swanton	H	2,800
Ohio	Indiana-Kentucky Electric Corp	Clifty Creek	S	200,000
Ohio	Ohio Valley Electric Corp	Kyger Creek	S	200,000
Wis.	Dahlberg Light & Power Co	Gordon	IC	521
Minn.	Virginia Water & Light Dept	Virginia	S	7,500
Iowa	Milford Municipal Light & Water Works	Milford	IC	645
Neb.	Burwell Municipal Utilities	Burwell	IC	645
Fla.	Wauchula Light Dept	Wauchula	IC	900
Okla.	Perry Light & Water Plant	Perry	IC	1,350
Utah	Garkane Power Association, Inc	Torrey	H	300
Ore.	Army Corps of Engineers	Lookout Point	H	40,000
Ore.	Army Corps of Engineers	McNary	H	70,000

RETIREMENTS

Conn.	Hartford Electric Light Co	Dutch Point	S	4,000
Ohio	Dayton Power & Light Co	Frank Tait	S	20,000
Wis.	Dahlberg Light & Power Co	Gordon	IC	136
Minn.	Northern States Power Co	Jordan	S	870
Iowa	Milford Municipal Light & Water Works	Milford	IC	100
W. Va.	Wheeling Electric Co	42nd Street	S	9,000
N. C.	Duke Power Co	Portable	IC	75
N. C.	Duke Power Co	Mount Holly	S	6,400
Fla.	Wauchula Light Dept	Wauchula	IC	250
La.	Franklin Municipal Plant	Franklin	IC	275
Okla.	Perry Light & Water Plant	Perry	IC	120
Tex.	Central Power & Light Co	Port Isabel	IC	60

U. S.	Hydro	Steam	IC	Total
Added	113,100	7,500	4,091	124,691
Retired	.....	40,270	1,016	41,286
Adjustments Plus	28,100	12,500	1,384	41,984
Adjustments Minus	140	.....	746	886
Net Change Plus	141,060	20,270 Minus	3,713	124,503

H—Hydro, IC—Internal Combustion, S—Steam
United States Capacity as of Mar. 1—Hydro 23,607,892 kw; Steam—77,856,465 kw; Internal Combustion—2,277,457 kw; Total, 103,741,814 kw.

DP&L Negotiates to Build Power Plant for Refinery

Plans for a new $18-million plant to be built and operated by Delaware Power & Light Co are in the contract-negotiating stage with Tide Water Associated Oil Co, the utility has disclosed.

The proposed power installation is intended to supply Tide Water's huge, $100-million refinery, programmed for construction on the Delaware River, approximately 15 miles south of Wilmington.

If agreement on the contract terms, under consideration, is reached, Delaware P&L "will be fully compensated for the investment required . . . and such expenditures will be added to the regular construction program of the company for the years 1955 and 1956," the utility revealed.

Utility spokesmen declined further comment, pending outcome of the contract negotiations. A Tide Water executive in San Francisco, however, confirmed plans for the power plant, saying, "It hasn't been determined yet who's going to build it. The only certain thing is that there will be an $18 to $20 million power plant built."

Buys Steam Plant Site

Salt River Power District, Phoenix, Ariz., has purchased an 80-acre site for a new 100,000-kw steam power plant. The district plans to use about 20 acres of the site for the $13 million plant, and add another 100,000-kw unit when business demands. Work on the new plant will begin in August. Shareholders in the Power District have voted an $11-million bond issue to finance construction. The remaining $2 million will come from retained earnings.

"LET GO, JIM!

Pole Star®

LOW VOLTAGE BUSHINGS won't turn when the terminal is tightened!"

That's right, Jim . . . you can drop that anchor wrench and relax. The new Pole Star locked-in, low voltage sidewall bushing features a double-keyed construction that prevents it from rotating in whole or in part when the line connection is being made. This eliminates the possibility of loosening the inside bushing connections . . . and guarantees against any disturbance of the gasket seal that might result from movement of the bushing.

You see, the opening in the tank wall has a projection like this — that engages a corresponding groove in the porcelain of the bushing. Also, the terminal is locked to the porcelain with a similar key-and-slot arrangement so that the entire bushing assembly is securely locked in place.

This new double-keyed low voltage bushing is a Pole Star standard for single phase units up through 167 Kva. The terminals are suitable for use with either copper or aluminum conductors.

Pole Star Distribution Transformers are available in single phase sizes from 3 through 500 Kva, 480 through 67,000 volts.

POLE STAR

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Pennsylvania Transformer Company

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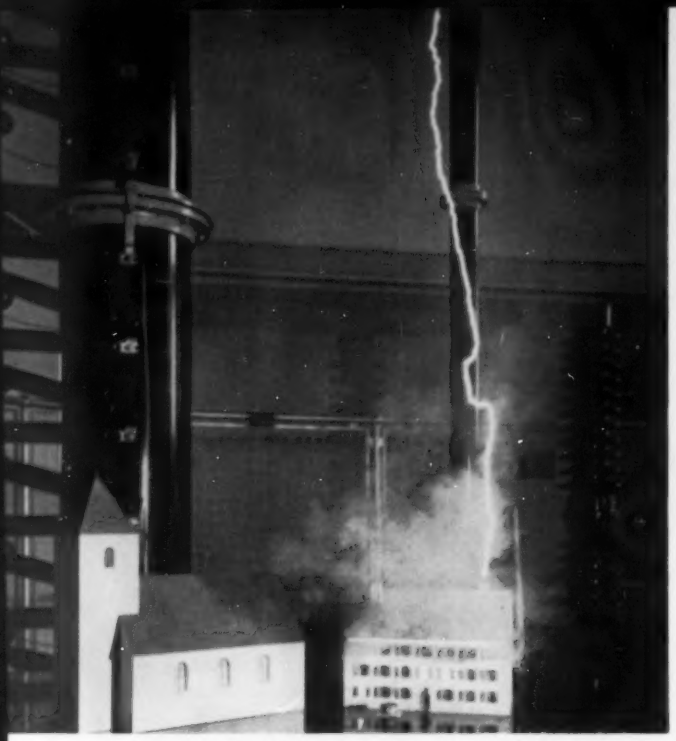


IMPULSE GENERATOR simulates effects of lightning and shows what it does in striking houses, both well and faultily grounded

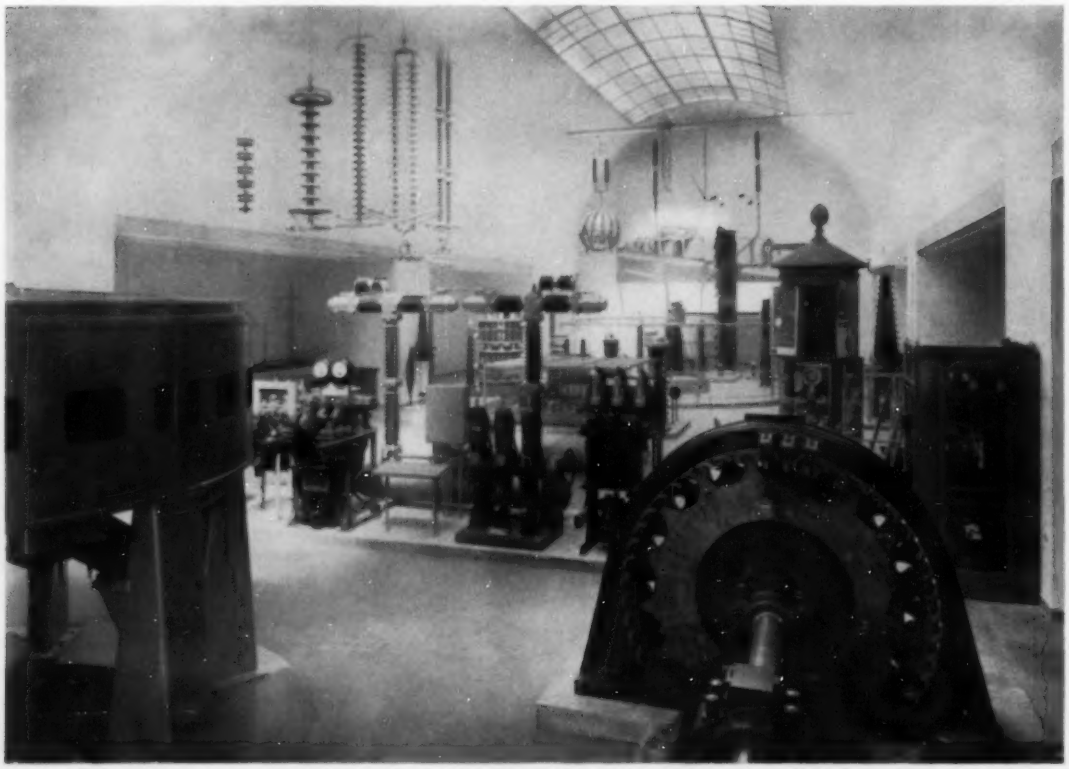
German

War-damaged institution,

PROF H. PRINZ and DR A. WISSNER,
Munich, Germany

For many years the Deutches Museum in Munich, Germany, has stood as a monument to man's technological progress in science and engineering. During World War II it was severely damaged and closed down, shutting off the flow of visitors which since 1925 had averaged 1,000 a day, or a total of over 9 million. Today, the museum has been restored almost completely, thanks to United States contributions as well as aid from other countries. And in May, the museum will celebrate the 100th anniversary of the birth of its founder, Oskar von Miller.

Like its counterpart in this country,



HISTORY OF DEVELOPMENT of three phase engineering is displayed in room above. Work of such pioneers as Haselwander, Dolivo-Dobrowolsky, and others, can be seen alongside newest machines. Scale models are in side recesses

Museum Shows Progress of Industry

rebuilt with U. S. aid, has electrical equipment exhibits ready for centennial of founder's birth

the Museum of Science and Industry, Chicago, the Deutches Museum was set up to preserve a record of the historical development of all branches of natural science and technology. Major advances in different fields are demonstrated by the particular masterpieces in these fields. To this end a number of originals, or working models of originals, are displayed.

Annexed to the museum is a library with a comprehensive archive section, containing records and letters, hand sketches, and biographies of eminent figures. Before the war a tour of the various collections in the Deutches Museum involved a 10-mile walk.

Power Section Restored . . . No time was wasted restoring the museum after the destruction of the war. One of the most recent and most interesting sections rebuilt was the Heavy-Current Engineering Section. This was reopened a year ago. This section is comprised of two halls: the smaller representing the historical development of heavy-current engineering up to the turn of the century; the larger being devoted to modern 3-phase engineering and covering even the most recent 380-kv transmission built in Sweden.

The Deutches Museum has expressed particular gratitude in the rebuilding of this section for contributions from the United States by: the Bureau of Reclamation, the Los Angeles Department of Water & Power, Okonite-Callender Cables Co Inc, (now Okonite Co), and Westinghouse Electric Corp.

Historic Generator Displayed . . . The history of heavy-current engineering has been traced back as far as Faraday's induction experiments in 1831. The apparatus on display enables visitors to carry out these experiments for themselves. One year after Faraday had published his epoch-making studies of induction, the first rotating generator was built by Pixii, Ampere's mechanic. A machine of this type, dating from those early years, can be seen in this room. Another outstanding exhibit is the first dynamo built by Werner von Siemens in 1866.

Pioneers in other countries are commemorated in a similar manner. The United States is represented by a bust of its most famous electrical engineer, Thomas Alva Edison. This was donated by the American Institute of Electrical Engineers in 1931.

On the left side of the room machines made by Siemens, Gramme, Schukert, and others, show the development of dc engineering. Here too is one of the first machines made by Edison. This was the equipment displayed at the International Electrotechnical Exhibition in Paris in 1881. Later it was used to supply power for lighting the Strassburg railway station.

Another Edison landmark on display is a model of the Pearl Street Power Station in New York built by Edison in the same year. This model was shown in 1904 at the World Exposition in St. Louis and presented to the Deutches Museum in 1926 by Dr J. W. Lieb, a former co-worker of Edison. Next to this model is the first large "block station" in Berlin built in 1884 by the German Edison Co (later the AEG).

Early AC Engineering Portrayed . . . The visitor here is also reminded of the first transmission of electric power over a long distance—from Miesbach to Munich in 1882.

The right hand side of the hall deals with ac engineering. In one half are displayed various types of early ac generators and transformers. Three dioramas show the development of the first ac power stations.

In the other half the beginnings of 3-phase engineering are portrayed. Working models show the development of the rotating field. Of particular interest among the machines set up here are the first 3-phase generator made by Haselwander (1887), and the first asynchronous motor made by Dolivo-Dobrowolsky (1889).

To the museum's regret it possesses neither the original nor a model of a machine made by Tesla. This pioneer of 3-phase work figures only in the chronological table for development of heavy-current engineering.

Working models in recesses at both sides of the room can be operated by visitors to find out how dc, single-phase, and 3-phase machines function. The rest of this room is taken up with the development of rectifiers.

The adjacent hall is devoted to modern 3-phase engineering. On display is the 3-phase generator supplying a transmission line from Lauffen on the Neckar to Frankfurt in 1891, an impressive experiment that convincingly demonstrated the advantages of 3-phase current. A model of the power station built for this project by Oskar von Miller is alongside. This is flanked by dioramas of the Walchensee power station and the Innertkirchen cavern-type of power station. Also on display are a full-size 3,000-kva umbrella-type generator and portrayals of

GERMAN YOUTHS find out what it takes to generate a kilowatt by hand power

NEW
functional appearance

NEW
improved ventilation

NEW
bracket construction

NEW
dripproof protection

...keep Elliott out ahead in large 4-or-more pole induction motor design

These long-life, babbit-lined bearings are designed to give positive lubrication. Note the removable and adjustable laby-rinth-type bearing seals. These prevent oil or oil vapors from being drawn along the shaft onto the motor windings.

It's the latest Elliott step forward in motor construction to bring you improved performance and simpler maintenance. Note the modern functional design of the rectangular frame. Important structural strength for lifting also is contained in this frame construction. Other features you will like are the heavy rigid flat steel plate bearing brackets, split horizontally with the upper half easily removable for internal inspection. Ring-oiled split sleeve bearings are built to stand abuse and Kolene-processed to last. Get complete details in Bulletin PB 7000-2. Write Elliott Company, Ridgway, Pa.

Elliott FABRI-STEEL

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B5-1

TURBINE-GENERATORS · TURBINES · MOTORS · GENERATORS · DEAERATING HEATERS · EJECTORS · CONDENSERS · COMPRESSORS · TURBOCHARGERS · TUBE CLEANERS · STRAINERS

MODEL OF EDISON'S first central station built at Pearl Street, New York, in 1881, was presented to Deutches Museum by Edison's co-worker, Dr J. W. Lieb in 1904

ANOTHER EDISON LANDMARK, this machine once lit Strassburg station

the development and construction of the 3-phase transformer.

In this hall are the chief protective and operating equipment of a power station. A small generator can be operated by visitors. Voltage regulators are mounted on one wall. A diorama of the Aschaffenburg control room of the Bayernwerk is built into a recess, and the development of overvoltage protection can be studied here.

Circuit Breaker Story Told . . . Among lightning arresters the visitor can see one made by Elihu Thomson in the '90's and presented by him to the Deutches Museum in 1913. Another early arrester is the Westinghouse autovalve of 1928.

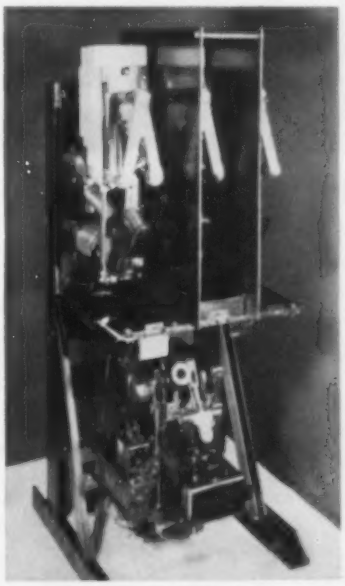
Moving on in this hall, the visitor comes to the section dealing with power distribution. Recorded here is the development of high-tension circuit breakers, starting with an air break switch of 1898, continuing with the development of the oil circuit breakers, and ending with a modern 150-kv compressed-gas circuit breaker. A Westinghouse Deion-grid circuit breaker is displayed among the oilless types. Mounted on a pillar opposite is a remote control unit whose measuring and control impulses illustrate the principle on which this latest technique is based.

The main exhibit in the power distribution section is a working model of a 110-kv switchyard whose switches can be operated.

The development of cables and overhead lines and their accessories are shown in detail. The most notable exhibits here are an original cable made by Edison with hemp-cord insulation, a paper-insulated cable by Ferranti (1891), a high-tension cable by Okonite-Callender Cables, and a complete length of 220-kv oil-filled cable. Another interesting exhibit is a model of a transformer substation complete with cables built over 50 years ago.

A series of scale models show the development of overhead transmission systems, including high-tension towers. To give visitors an idea of actual dimensions, a number of original insulator strings are on view, including one used at Boulder Dam which is connected by a red cord to the appropriate transmission tower model.

Also shown in display cases are accessories for overhead systems, insulators, connectors, dead-end clamps, and a Stockbridge damper. Other working models show how overhead lines and cables behave under various operating conditions.



AMERICAN EQUIPMENT includes this Westinghouse Deion-grid circuit breaker

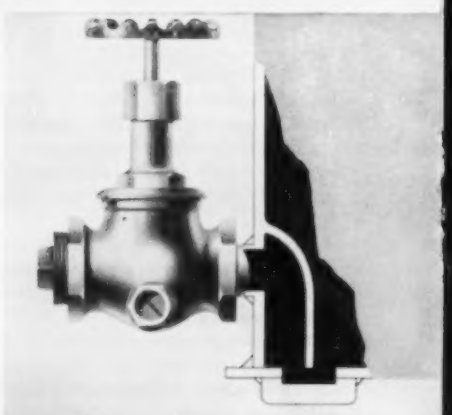
The high-tension laboratory fills the last third of the hall and demonstrations are given three times daily. A 300-kv testing transformer is used to show arc-overs, creeping discharges, and the protective function of the Faraday cage. In addition there are a transformer with a horn-type spark gap for 30 kv and a heavy transformer for 10,000 amp.

Visitors can be entertained with experiments carried out with an 1.1-million-v impulse generator, simulating the effects of lightning on small model houses and an overhead line, both with good and bad grounding of the lightning rods. The flashover on an insulator, with splitting of wood, and the melting of a wire, are also shown.

Electrical Applications Demonstrated . . . There is a display giving a general view of the problems connected with modern electric power supply, with two models to illustrate reactive current compensation. In another display numerous experiments are carried out to give a picture of the multitude of applications possible with electrical energy. To gain some ideas of the size of a kilowatt and a kilowatt-hour, the visitor can operate a crank and a tread wheel with small generators, thus converting his own strength into electrical energy.

On the walls are pictures of modern large power stations, including Grand Coulee. Models show details of a transformer substation, and of the connection of a domestic consumer.

WSB tap changer—one tap change with each revolution of operating handle.



Drain valve arrangement—assures complete drainage, damage protection.

Improvement program builds extra value into standardized power transformers

Simplified installation, reduced maintenance, improved performance—these are the results of the broad-scale improvement program for Westinghouse standardized power transformers. Here are some outstanding examples:

Instrument and accessories—more readily accessible, easier to read from any angle, completely protected by tank braces.

Four-way sled runner base—for easier handling. Cast steel lugs welded to the base prevent digging into wooden rollers—provide means for attaching towing cables with a standard clevis.

New valve arrangement, combined with tank sump, assures bottom sampling and complete oil drainage. Valve is placed above tank base for protection in shipping and handling and to avoid interference with tank welds.

New RJ bushing for voltages 15 kv and below. Features a flange rolled into two grooves cut in the porcelain and sealed by silicone rubber gaskets. So supported, bushings cannot crack due to uneven tightening in assembly or from stresses of normal operation. ASA standard bushings furnished for voltages above 15 kv.

WSB tap changer, now provided on all standardized power transformers, insures proper centering of contacts through a Geneva gear action requiring one complete revolution for each tap change. Button contacts are self-cleaning—arranged to provide parallel current paths to obtain maximum contact pressure during fault currents.

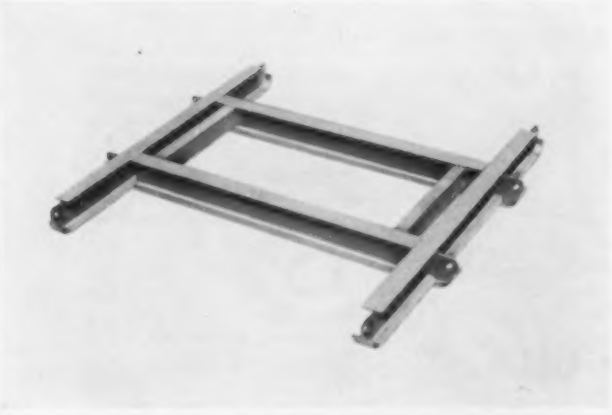
"Coastal Finish"— now used on all standardized power transformers. Provides an armor coat of mica flakes that insures complete protection under all operating conditions.

For still more dollar-saving details on Westinghouse standardized power transformers, call your Westinghouse sales engineer or write for B-5914, "Standardized Savings", Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-70750

YOU CAN BE SURE...IF IT'S

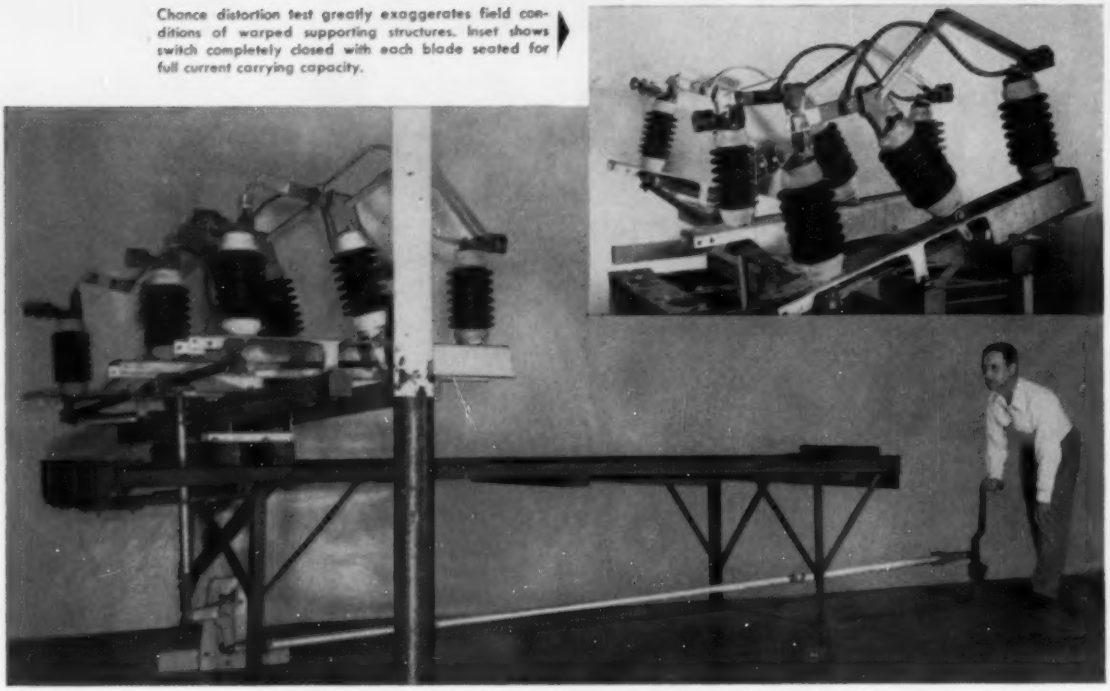
Westinghouse



4-way sled runner base—simplifies handling, provides means for attaching towing cables with a standard clevis.

RJ bushing—rolled flange design prevents cracking in installation or from stresses of normal operation.

Chance distortion test greatly exaggerates field conditions of warped supporting structures. Inset shows switch completely closed with each blade seated for full current carrying capacity.



Torture rack tests prove

CHANCE WN-VN Switches

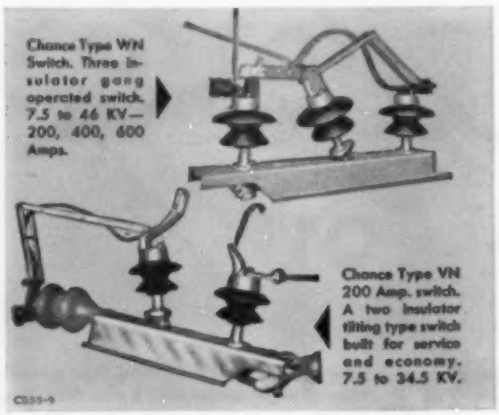
make positive contact under all conditions

Even the most violent warping of green crossarms under unequal line tension will never distort the phases of your gang-operated switches as greatly as the torture rack shown in the picture above. But even if they did—your CHANCE WN-VN SWITCHES would still open and close uniformly and easily. The reason? . . . The exclusive Chance Compensator Control that operates each phase independently of the others—that eliminates closing shock even when switch blades are slammed, and gives extra leverage for smooth, easy operation. Compensator control also keeps the operating force in line with the blade motion. WN-VN switches can't get out of line.

Chance WN-VN Switches are easy to install—time consuming "threading" of the interphase shaft is eliminated because the shaft is clamped into position—you can even mount these switches below the pole top without shifting them off balance.

There are other features you'll like, too . . . the extra wide tilting insulator mounting that eliminates side play . . . the deep-drawn flanged bases that won't cut into wood supports . . . and the ice breaking "crow bar action" that enables one man to easily open or close these switches even after the most severe ice storm.

But get the whole story. Ask your Chance Representative, or write for complete catalog information and test data.


Chance Type WN Switch. Three insulator gang operated switch. 7.5 to 46 KV—200, 400, 600 Amps.
Chance Type VN 200 Amp. switch. A two insulator tilting type switch built for service and economy. 7.5 to 34.5 KV.
CS55-9

You know it's RIGHT when you specify CHANCE

A·B·CHANCE CO.

CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

Using clever promotion . . .

and money-back guarantee . . .

CEI Ups Dryer Sales 50%

If customer isn't delighted, his purchase price is refunded as Cleveland utility takes a new swipe at its gas competition

The old "money-back" guarantee is being put to work on electric clothes dryers by Cleveland Electric Illuminating Co, and the results show the appeal has lost none of its snap.

CEI expects dryer sales increases of at least 50% over the year ago period as it tabulates results of its 7-week "Guaranteed Delight" program. The utility guaranteed the purchase price to the customer of any 240-v dryer bought between Feb. 10 and March 31. Figures for January and February show a 36% sales jump over the same period a year ago, with most of the boost coming after the promotion got underway. Last year 16,600 electric units were sold in the CEI service area.

Under terms of the arrangement, CEI agreed, with the cooperation of most of the major distributors in the area, to guarantee customers their full purchase price within 30 days after purchase, if they were not entirely satisfied with the performance and service given by the machine. The guarantee affected only the customer's "delight" in his new labor saving device, and not mechanical performance which is covered by the manufacturer and/or dealer.

On the closing day of the promotion, CEI was able to report that thus far it had not received one request from a customer to remove his machine and refund his money. Under the deal, CEI had made arrangements with the distributors to take back any returned dryers with approximately 15% loss to CEI on any machine returned. A few potential customers, CEI reports, were turned away from final purchase because the installation would have meant installing a three-wire system to unit from the fuse box, at a charge from CEI of approximately $24 for a 25 ft. run. CEI makes no charge for bringing three-wire (240-v service) from the utility pole to the customer's fuse box.

The company estimates that roughly half the dryers sold under the promotion are going into older type homes, which require addition of a third line for 240-v service.

CEI had laid heavy stress on its electric dryer promotions in the past, first because of the dryer's high power use, and secondly because of the stern competition promoted by the local gas company on gas dryers.

That constant battle is slowly resulting, CEI officials claim, in victory for the electric utility. Their gas competition, they say, has the third lowest gas rates in the country. Yet CEI now claims that 7 out of 10 of its customers who own dryers are using electrical units. They estimate that as of now, 14% of all their customers are using electric dryers, and their target on this "percentage of saturation" is 25% by 1960.

Against this, CEI men claim, the local gas utility was able to sell 8,000 gas dryers in 1954, with estimated advertising expenditures of over $60,000. Although CEI will not be pinned down on its actual dryer promotion expenditures, they say unofficially their costs are well under the $20,000 per year figure.

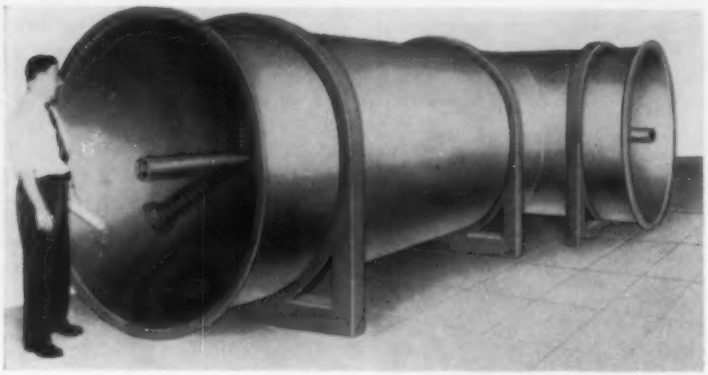
Approximately 650 dealers in the CEI service area took part in the program, with CEI offering to send every dealer who sold more than 18 dryers during the "Guaranteed Delight" promotion to the Kentucky Derby—all expenses paid.

Give Pitch A Local Slant To Sell Clothes Dryers

Down in sunny Arizona where selling clothes dryers to housewives is about as tough as selling refrigerators to the you-know-whats, they're trying a new approach.

It doesn't rain much in those parts, so that perennial pitch doesn't work. "Instead," says William H. Johnson, manager of Appliance Merchandisers Assn. in central Arizona, "we try it from a problem that we do have here—dust. Clothes dryers can end that worry in a hurry." Other sales points used: clothespin "ears" from line-dried washings; faded colored clothes from drying in the strong sunshine.

MANUFACTURERS AND MARKETS

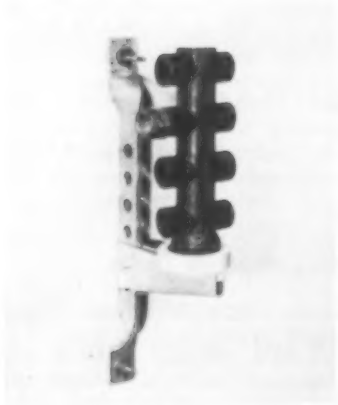


R&IE Builds 138-kv Isolated-Phase Bus

Largest bus structure of the metal-enclosed, isolated-phase type will be built by R&IE Equipment Division of I-T-E Circuit Breaker Co for Consolidated Edison Co's East River Station.

The bus will have a voltage rating of 138-kv; a curent rating of 1,200 amp continuous and 60,000 amp momentary. The bus structure will be built in pre-assembled sections of various lengths. Above illustration is a view of the early development of the new bus structure.

R&IE and Consolidated Edison have pioneered in this type of bus and switch construction for 13 kv, then 27 kv, later 69 kv, and now 138 kv.



How Do You Rack Moles? Let Burndy and Cope Tell

Racking practice for Moles has been facilitated by a cooperative effort of Burndy Engineering Co of Norwalk, Conn. and T. J. Cope Co of Philadelphia, Pa.

Burndy's Mole is a cylindrical pre-insulated connector serving as a common junction device with outlets for two to sixteen branch circuits. It is available in two sizes—1,500 amp and 2,000 amp, and is used frequently with underground distribution lines.

Cope has recently designed a rack which can support both sizes of Moles, and if necessary 3-phase circuits. A standard wall mounted rack has a horizontal arm with two types of porcelain supports. The circular type support is used where the Mole is to be supported vertically. The semi-circular type support is used for horizontal positioning of the Mole on the arm. Former type is shown.

Aluminum Ltd to Double Kitimat Smelter Capacity

Aluminum Ltd, of Canada plans a $190 million expansion that will more than double the capacity of its aluminum smelter at Kitimat, B. C., according to an announcement by Nathaneal V. Davis, president. The new program is planned to bring Kitimat's productive capacity to 330,000 tons annually by 1959. Capacity is about 91,500 tons at present; expected to be 181,500 tons by the end of 1956. The balance is planned to come into operation in stages and to be completed by 1959.

Westinghouse to Build Nuclear Test Reactor

Westinghouse Electric Corp will build what is claimed to be the world's first industry owned nuclear materials test reactor according to a recent announcement by Gwilym A. Price, president of Westinghouse. The $6.5 million reactor, to be used for testing materials under conditions of intensive nuclear radiation, will be the first element of a "reactor center" to be built by the company. The test unit will operate in the range of 10,000 kw.

Approval will be sought from the Atomic Energy Commission to locate the reactor center on the company's 550-acre site near Blairsville, Pa., 40 miles east of Pittsburgh. Price stated that the unit will be built without government subsidy or guarantee of governmet work and should be in full operation within two years. It will be known as the "Westinghouse Test Reactor (WTR)" and when completed it is expected to have the largest physical capacity for full-scale testing of atomic power plant components of any test reactor in the United States, declared Price.

Remainder of the reactor center will include a laboratory constructed near the reactor building to handle and process radioactive materials resulting from the reactor tests, as well as general offices, and facilities for heat and power.

English Electric Ships 130-ton Transformer

English Electric Co, Ltd, of Liverpool, England, recently shipped a 130-ton transformer to Seattle City Light. The transformer is the first of two which will be installed in City Light's $3.5 million Duwamish substation.

Unloading the large transformer at Seattle created an unusual problem since the only crane in the area large enough to handle the task is across Puget Sound in the Puget Sound Naval Shipyard at Bremerton. It was finally decided to transfer the transformer from the ship to a railroad flatcar at Bremerton and then ship the flatcar to Seattle by barge.

(More M&M on page 59)

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It Costs Less to Buy the Best

Turbine Manufacturers Save Fuel for Utilities

Substantial reduction in the amount of fuel consumed by electric utility companies for each kilowatt-hour produced is made possible by the nation's turbine manufacturers. The reduction is accomplished through progress in the design of large reheat turbine-generator units in the past few years.

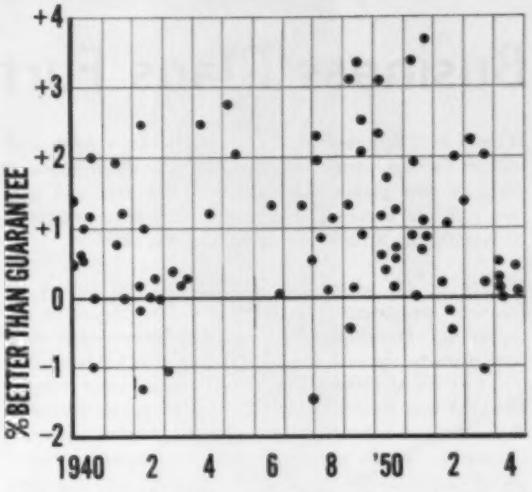
General Electric Co estimates that during 1955 its contribution to this achievement will be the equivalent of about 70 million pounds of coal. Several factors have played a part in this progress.

In tested reheat machines, the gains are significant above the 100,000 kw size. Heat rates can now be improved 0.15% at 150,000 kw, 0.4% at 200,000 kw, and 0.6% at 250,000 kw, over previous predicted heat rate values. Accompanying graph shows the relationship between test and guaranteed efficiencies for machines tested in past 14 years.

Progress in the turbines utilization of thermal energy has been made possible by improvements in bucket shapes and stage design, also by electronic computing methods of aerodynamic principles to design of stages.

During 1951 through 1954, General Electric has incorporated the improvements in 6,808,700-kw capacity of turbines which will be supplying power through 1955 and following years.

Assuming that each of these machines will produce its rated kilowatts for 7,500 hr per year, and that an average energy content in a pound of coal or equivalent is 12,500 Btu, the improvements in efficiency listed will save a million tons of coal throughout the useful life of these turbines.



TEST EFFICIENCIES are shown in relationship to guaranteed efficiencies of turbine-generators larger than 10,000 kw

American Standards in Process of Approval

American Standards Association has advised the status of the following Standards.

In Standards Board—Terms of Electron Tubes, Definitions of, C 60.9. Terms of Magnetrons, Definitions of, C 60.10. Terms of Gas-Filled Radiation Counter Tubes, Definitions of, C 60.12. Sponsor, Joint Electron Tube Engineering Council.

Standards Submitted — NEMA Standards for Asbestos, Asbestos-Varnished Cloth, and Asbestos-Thermoplastic Insulated Wires and Cables, C. 8.36. Sponsor, Electrical Standards Board.

Project Initiated—Terminology for Automatic Controls, C 85. Sponsor, American Society of Mechanical Engineers.

Ryerson Acquires Harvey

Joseph T. Ryerson & Son, Inc has acquired the plant and stocks of Arthur C. Harvey Co of Boston, a steel and aluminum distributor, according to Charles L. Hardy, Ryerson president. The former is a wholly owned subsidiary of Inland Steel Co of Chicago, Ill. Ryerson plans to consolidate its Greater Boston operations at the Harvey plant. Robert T. Harvey will be manager of the new department.

$36 Million Low Bid for Barnhart Powerhouse

Merritt, Chapman and Scott Corp and the Savin Construction Corp by a joint venture submitted the low bid of $36,229,760 for the Barnhart Island Powerhouse at the St. Lawrence Power Project near Massena, N. Y.

Six bids were received by the Power Authority of the State of New York; highest was $43,709,000. Bids were opened April 15 and will be evaluated for an award.

The power plant, a modified outdoor type housing 16 hydroturbine-generators, includes an erection bay, control room, offices and miscellaneous shops. The powerhouse and dam on the American side are essentially similar to the one on the Canadian side, bids for which will be taken in May.

The Authority previously awarded contracts for the waterwheel turbines, generators and other equipment for the powerhouse. Complete construction is scheduled for Sept. 1958.

MANUFACTURING BRIEFS

Nuclear Development Associates, Inc of White Plains, N. Y., has purchased a 1,100-acre tract in Dutchess County, N. Y. to serve as a scientific laboratory. NDA, founded in 1948, provides research and development service on atomic power projects and nuclear technology applications.

Monsanto Chemical Co is expanding the facilities of its plastics division plant at Springfield, Mass., for production of vinyl chloride polymers and copolymers. The added capacity is expected to more than double the company's participation in a 400 million pound annual market for the resins. Production at the new facilities is scheduled for early next year.

ELECTRICAL BUSINESS OUTLOOK

Business Plans Further Expansion

It looks as if business activity is going to get a good solid shot in the arm—from business itself. Business' plans to purchase new plants and equipment this year and next (see p 8) are about as favorable as they have ever been to maintaining a high volume of business activity.

Results of the eighth annual McGraw-Hill survey of business' investment plans confirm the key result of the earlier SEC-Department of Commerce survey—that business plans to increase capital spending (EBO, March 28). The fact the McGraw-Hill survey shows a greater increase for 1955 may be due to the later date of the survey, or to the fact that it is based primarily on the plans of the larger companies, which sometimes increase capital spending faster than smaller business. Either way, the important thing is that plus sign.

Outlook Favorable Through 1956

Traditionally, capital spending is one of the volatile elements in the economy. It often leads other business activity either up or down. The fact that business plans to increase this spending is thus one of the strongest possible signs for business activity in general.

The fact that preliminary plans are strong right through 1956 and even beyond is another good sign. While these plans are of course tentative ones, the very high level is certainly a good omen—the strongest the McGraw-Hill survey has ever revealed.

Plans are fine—but will they work out? Capital expenditures are, as noted above, an up-and-down part of business. They can be changed sharply; one group of companies in a major industry cut their spending plans by more than 20% in the space of about eight months last year.

Factors Supporting Confidence

If business activity should take a tumble for some other reasons, then capital spending plans undoubtedly would be cut. But barring a drop in general business, there's good reason to think that plans will be carried out—for these reasons:

● **Business has the money.** Elimination of the excess profits tax last year, plus the present rising tide in sales, has pushed corporate profits back to very substantial proportions. Profits after taxes were $18.3 billion in the boom year of 1953. Last year they dropped to $17.8 billion. This year, a good guess puts them in the neighborhood of $18.5 billion or more for the year.

Revival in profits means that business will be able to boost dividends this year and spend something extra for new plants and equipment. Dividends were about $9.9 billion last year; they will probably pass $10 billion in 1955.

Besides retained earnings, business can call on a record volume of depreciation charges this year—$14 billion for all corporations. Last year, depreciation charges ran about $12.5 billion. In 1953 they were less than $12 billion.

● **Competition forces capital expenditures.** Results of the McGraw-Hill survey last year showed clearly that business was entering a period of intense competition. Today, no one needs to take a survey to find that out. Even in a period of prosperity, competition for new business is intense.

Intense competition means that business needs new capacity to produce new and more attractive products. And it means that old machines have to be replaced often with newer, more efficient ones. It all adds up to higher capital expenditures.

This competition isn't going to disappear—even if the boom continues. If business should decline even a little, competition will get keener than ever. So competition is a basic force that will help maintain business purchases of new plants and equipment for a good many years to come.

● **Business is confident.** Whether it is confidence in the Eisenhower Administration, confidence in themselves, or a general confidence in the American economy, is a matter of some dispute. But in any case, this confidence is apparently a key factor in business planning.

Confidence, of course, is a fragile flower. It might be destroyed by political or economic reverses. But so far, there's no sign of any shaking.

● **Business needs new capacity.** It's a widely known fact that there is excess capacity in many manufacturing industries. So why does industry build new plants? Two of the reasons are indicated above—to produce new products or to make old products more efficiently. But there's another reason, which results of McGraw-Hill survey make clear.

Excess Capacity Found Desirable

Business wants excess capacity—quite a bit of it. Manufacturers were asked at what rate of capacity they were operating at the end of 1954, and what rate they would prefer to operate at. On the average, they were operating at about 84% of capacity at the end of last year, but would prefer to operate at an average of 89%.

The answer shows one reason why they are building new capacity. Expected gains in sales this year won't make most manufacturing companies operate anywhere near their full capacity. But these sales gains will push many of them up over the rates that they would prefer to operate at. So they will build more "excess"—but desired —capacity.

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	Per 1000 Ft. Lbs.	Cost
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#4 Solid Alum PE (2/64)	48	26.90
#4 Solid Alum Neo (3/64)	64	26.90
#2 7 Strand Copper TBWP*	270	113.48
#1/0 7 Strand Alum PE (4/64)	141	70.60
#1/0 7 Strand Alum Neo (4/64)	172	70.60
2/0 7 Strand Copper TBWP*	522	208.43
4/0 7 Strand Alum PE (4/64)	261	138.00
4/0 7 Strand Alum Neo (4/64)	306	138.00
4/0 7 Strand Copper TBWP*	800	317.84
336400 CM, 19 Str. Alum PE (4/64)	388	216.00
336400 CM, 19 Str. Alum Neo (5/64)	469	231.00

Jan. 31, 1955 prices based on 30,000#—F.O.B. Destination
*URC Copper Triple Braid Weatherproof

Sales Challenged to Improve Rates of Return

EEI Sales Conference warned that engineering economies are headed toward less returns. More research and better load factor are seen as solution

Can sales take over engineering's job of fighting the utilities' battles against rising business costs? Can sales do a better job of improving rates of return?

At the recent sales conference of Edison Electric Institute (EW, April 18, p 106) the feeling was that the sales group can do both. At least there was talk among the group that it must try.

Engineering Gains Near Point of Diminishing Returns . . . Philip Fleger, chairman of the board, Duquesne Light Co, advanced some solid reasons why sales must come to the rescue. The engineering side of utility operations, he told the group, is heading toward the point of diminishing returns in its struggle to offset rising business costs. To its credit is a long series of technical triumphs in generation, transmission, and distribution. But from here on, he said in effect, to squeeze a kilowatt hour out of two or three fewer ounces of fuel isn't going to make the difference needed.

With that he tossed the ball to the sales force. Devise sales activities that can improve load factor, he told them, and with it improve earnings performance. "With improvement in our heat rate levelling off and with little opportunity to reduce reserve capacity, increased load factor offers one of the most effective means of reversing the downward trend in our rate of return."

Earlier Philip Sporn, president, American Gas & Electric Co, had urged promotion of the heat pump and electric heating as a step in this direction. A similar plug for lighting was supplied by Merrill E. Skinner, vice president, Union Electric Co of Missouri.

To meet this challenge to improve load factor through sales activities better marketing data will have to be secured through load research. This belief seemed prevalent among the conferees. In the commercial section discussion on this point was the strongest. Philadelphia Electric Co's Constantine Bary, an old hand at load researching, gave a thorough demonstration of how some sound market probing from the sales and rate angle can help forecast and control profitable loadbuilding.

Armed with a wealth of data on commercial and small industrial customers of his own company, Bary showed how digging into cost of service, price structure, nature of class of customer, etc, can turn up conclusions not always evident in off-the-cuff assumptions. If his audience grasped nothing else, they came away with the realization that more statistical data and less off-hand judgment can help them to more profitable sales management.

Utilities Need More Scientific Selling . . . The upshot of it all is that utilities like everyone else could well use more science in their sales activities. As a means of achieving this, look for the utilities in the days ahead to make conscientious efforts to develop more load research.

TECHNICAL NOTES

Restrike-free operation of a circuit breaker under all conditions is difficult to achieve unless arc extinguishing action is independent of current interrupted and so powerful that it is also adequate for the short-circuit interrupting rating.

Industrial systems respond to the same philosophies as utility distribution. Recommended practices are higher voltage, reduced impedance, voltage regulators, and switched capacitors.

Reliability of modern gear-driven air-cooled exciters 160 to 275 kw is attested by nine machines with no forced outages whatever in 86.8 machine-years of aggregate operating time.

Crater size of tungsten carbide anode in electric-spark metal cutting seems independent of cathode composition, but the cathode crater size varies with anode composition. On an 11-amp discharge for 1,500 microsec the cathode volume removed is about 0.23×10^{-10} cu in. with a brass anode and 0.84×10^{-10} cu in. with tungsten carbide.

Rate of change of impedance with current for a conductor surrounded by a magnetic enclosure (eg pipe-type cable) has a reversal of slope at low values of current; rate decreases with current at higher values.

Marginal hydro sites remain undeveloped because with conventional equipment they cannot compete economically with other power sources.

Apparent advantage of electrical transmission over shipping coal energy by rail may be lost if the generating plant and its transmission lines are not operated at high annual load factor.

Automatic clothes washers have contributed again to modern living—this time in the form of electrically operated faucets controlled by push buttons.

Boiler gage glass visibility by mirrors and floor holes between control room and drum took an architectural draftsman two weeks to lay out accurately to avoid all obstructions.

Tax Depreciation Discussed

U. S. Steel Corp's 1954 annual report reveals that the cost of capital is not recovered under the present tax laws

Of considerable interest to the electric utility industry was the discussion of tax depreciation which appeared in the United States Steel Corp's annual report for 1954. In essence, the report stated that under the present method of computing tax depreciation, based as it is on original cost, results because of inflation in only a partial recovery of the costs of facilities which will have to be replaced at a much higher level of prices. These depreciation policies are, in effect, a taxation of capital and result in the overstatement of "real" income.

The report said in part "The total number of dollars that can be recovered in depreciation over the life of a given facility is limited to the number of dollars originally expended for the facility. But the buying power of the dollar has not remained at all stable. According to the Engineering News-Record, it now takes $2.60 to buy as much construction as could be purchased for $1.00 in 1940. . . . Depreciation dollars recovered today, based on dollars spent many years ago for facilities, are simply not enough dollars to replace those facilities . . ."

Income Reinvested

"The other principal source of funds, aside from borrowing or from selling stock, that corporations have to modernize or purchase tools of production is income reinvested. If depreciation does not recover enough buying power, the income 'after taxes' may have to be drawn upon to make up the difference if expenditures for facilities are to be sufficient to maintain the aggregate tool-life of the concern.

"This is unfair and unfortunate because it results in the taxation of capital. Thus, if depreciation cost is understated in current buying power, then income is correspondingly overstated. If the income tax rate is 50%, then two additional dollars must be secured from customers to have one additional dollar after taxes to spend on facilities."

While the report noted the beneficial results arising from the use of Accelerated Amortization of Emergency Facilities in that it stimulated construction expenditures, nevertheless, it was a temporary expedient and posed problems for the future.

"For many companies the addition of amortization on new facilities to so-called regular depreciation on old facilities may approximate, temporarily, a truer total of wear and exhaustion on all facilities based on current dollar values. But it automatically guarantees something of a future crisis," the report said.

Depreciation Deficiency

Referring to the new methods of tax depreciation permitted under the Internal Revenue Code of 1954, the report said significantly "Partly in recognition of prospective deficiency in depreciation when industry's accelerated amortization amounts 'run out,' the Revenue Act of 1954 provides two new optional methods whereby regular depreciation on new facilities may be accelerated. Both methods permit greater proportions of expenditures to be recovered in the earlier than in the later part of the facilities' lives."

"For many companies," the report continued, "the new provisions may serve for a time to lift total wear and exhaustion to an amount approximating true depreciation based on current dollars, provided serious further inflation is avoided . . . For other companies, however, the new provisions must for a period fall far short of yielding proper wear and exhaustion amounts. *Such companies are like those in the steel, cement, and railroad industries where relatively large amounts of capital have to be invested in costly long-term facilities* (Italic supplied). If additional depreciation is to be confined to new facilities, then larger amounts than have been provided under these two methods on such new facilities are required adequately to augment so-called regular depreciation on the relatively more numerous and older existing facilities."

"Such a prospective depreciation dilemma is illustrated in the affairs of U. S. Steel. Total wear and exhaustion in 1954 were approximately $260 million. Of this amount about $140 million represented accelerated amortization and $120 million so-called regular depreciation."

Wear and Exhaustion

The report continued: "In future years necessary expenditures for replacing and modernizing facilities may range somewhere near the 1954 wear and exhaustion amount. Thus in a few years, when the accelerated amortization amounts arising out of present certificates will have substantially dropped out, there would then arise a large gap between wear and exhaustion totals and these necessary expenditures for facilities. The new sum-of-the-years' digits or declining-balance methods of depreciation will be inadequate for many years to fill this gap. It can be seen that even if there were to be as much as a 50% increase in so-called regular depreciation it would still leave the total wear and exhaustion amount much smaller than such expenditures.

"It is, of course, possible that before such a critical situation develops a fundamental solution of the problem of accounting for depreciation over periods of dollar instability may have been achieved and recognized in the tax laws or additional expedients may have been devised. *Failing that, U. S. Steel and many other concerns will have to secure funds for capital expenditures from other sources if the supply and modernness of tools are to be maintained* (Italics supplied). If such funds come from income reinvested, then prices of products sold will have to be sufficient to cover the heavy taxation, as previously noted, of what is really depreciation but under tax law is considered taxable income."

The annual report of U. S. Steel poses many interesting questions to the private electric utility industry. The capital demands of the electric utilities in the foreseeable future will be even heavier than those of the steel industry and the need for the adequate recovery of economic costs even greater.

Tax Write-Offs

(*Continued from page 9*)

beginning of 1955, they had about 103 million kw in working order. The companies are expected to complete installation of the remaining 13 million kw by the year-end.

Goal Set for 34 Million-Kw . . . The companies' plans to build all the capacity asked for by the government, gave ODM a chance to look again at what is needed from now on.

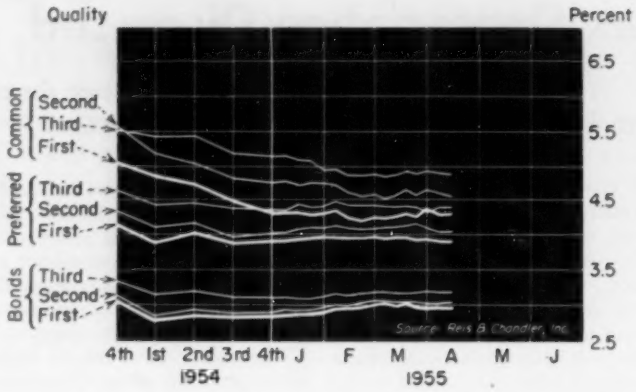
The economy's fast snap-back after the post-Korean decline is continuing, and ODM now has set its sights on having 34 million kw more by the end of 1958. It's taken its time establishing a higher goal because only three electric companies have applied for rapid tax amortization since the old goal was filled: Maine Public Service Co, which wants certificates to cover $2.5 million; Indianapolis Power & Light Co, which wants $14 million worth; and California Electric Power Co, which wants a certificate for a $5 million expansion. These applications will be processed first under the reopened program.

Other companies, of course, plan to expand. But, because the goal was suspended, they went ahead with their plans without applying. Applications for new generating capacity filed with the Federal Power Commission show plans are already in the works for 13.5 million kw. If the companies build this much, ODM will have only a little over 20 million kw to go after.

Future Studies to Be Made . . . ODM has not finished its studies of power needs. These are more or less continual, and the agency is now looking at the nation's capacity in the light of what would be needed in event of war, where bomb damage would be a consideration. During the next six months, it also will turn its attention to specific regional problems, a factor excluded in computations to date.

The agency's aim of 150 million kw nationwide capacity by 1958 is predicated on the assumption that this will provide capacity margins of 14.6% and 20% over peak loads under adverse and average water conditions, respectively. ODM Director Arthur S. Flemming told Congress a week ago that this compared favorably with the 15% generally accepted as necessary to provide reasonable standards of service in peactime.

Today's Utility Yields—(%)



	BONDS			PREFERRED STOCKS			COMMON STOCKS		
QUALITY.....	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
April 14.....	2.99	3.02	3.18	3.92	4.03	4.39	4.32	4.52	4.86
April 7.....	2.99	3.01	3.18	3.92	4.05	4.39	4.31	4.60	4.91

Utility Earnings

COMPANY	PERIOD MONTHS ENDED		NET INCOME 1954	NET INCOME 1953	EARNINGS PER COMMON SHARE 1954	EARNINGS PER COMMON SHARE 1953
Central Vermont PS.....	12	Dec.	$1,362,344	$963,708	$1.27(a)	$0.92(a)
Carolina P&L.....	12	Dec.	7,846,241	7,319,255	1.63	1.50
Consolidated Edison of N. Y.	12	Dec.	50,289,300	49,578,554	2.98	2.94
Houston Lighting & Power	12	Dec.	13,112,631	10,311,738	2.30(b)	1.99(b)
New York State E&G.....	12	Dec.	9,382,952	9,053,537	2.58	2.54
Northern States Power.....	12	Dec.	17,230,000	16,051,000	1.07(b)	1.10(b)
Ohio Edison and subsidiary.....	12	Dec.	20,271,000	19,329,000	3.02(b)	3.15(b)
Oklahoma G&E.....	12	Dec.	6,974,674	5,997,285	2.18	1.90

Notes—All figures shown above have been audited. (a) Based on average shares; and (b) Based on shares outstanding at year end.

Utility Financing

COMPANY AND DESCRIPTION	AMOUNT OF OFFERING (000)	OFFERING PRICE	YIELD TO PUBLIC
APRIL 14-20			
BONDS			
Philadelphia Electric—1st mtg 3¼% due 1985.....	$50,000	100.096%	3.12%
COMMON STOCK			
Savannah E&P—165,000 sh of which 100,000 sh was sold by Donner Estate and balance by company....	$5,198	$31.50	4.76%
SCHEDULED FOR APRIL—MAY			
BONDS AND DEBENTURES			BID DATE
Georgia Power—1st mtg due 1985.....	$12,000	.....	May 10
Jersey Central P&L—1st mtg due 1958.....	20,000	.....	May 10
Ohio Edison—1st mtg due 1985.....	30,000	.....	May 17
Alabama Power—1st mtg due 1985.....	15,000	.....	May 24
Southern California Edison—conv. debs (to be offered common and preferred holders).....	40,000	.....	.....
PREFERRED STOCK			
Public Service of Oklahoma—100,000 sh $100 par.....	$10,000	.....	.....
Southwestern Gas & Electric.....	6,000	.....	.....
COMMON STOCK			
Western Light & Telephone—87,000 sh (to be offered commonholders on 1-for-7 basis, record April 15)...	.....	.....	.....

W. L. McKeithan, Section Manager, Distribution Transformer Engineering, reveals this

FACT: New pole-type units have low weight where it counts

WEIGHT REDUCTION IN HIGHER RATED TRANSFORMERS			
	75 kva 2400v	100 kva 2400v	167 kva 2400v
Old Weight	1180	1395	2015
New Weight	975	1130	1475
Per Cent Reduction	**17%**	**19%**	**26%**

The new Westinghouse pole-type distribution transformers—75, 100, 167 kva—have been drastically reduced in weight. The 167-kva unit now permits direct pole mounting—and conforms to EEI-NEMA 6th Report Standards. This means easier installation and, quite often, saves change-out to a larger, more expensive pole. Example: 167 kva, 7620 to 120/240 . . . reduced from 2600 pounds to 1515 pounds.

Get more for your transformer dollar—and simplify operating problems—with the new Westinghouse designs.

• • •

Call The Man With The Facts, your Westinghouse Sales Engineer. Or write direct to Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pennsylvania. J-70740

YOU CAN BE SURE... IF IT'S

Westinghouse

STATISTICS

Total Electric Customers in the U.S. as of Year-end 1954

New England
3,306,952 (6.5%)

Me. – 333,952	Mass. – 1,607,837
N.H. – 212,143	R.I. – 276,565
Vt. – 127,357	Conn. – 749,098

Middle Atlantic
10,308,703 (20.1%)

N.Y.-5,133,846
N.J.-1,810,727
Pa.-3,364,130

East No. Central
10,566,379 (20.6%)

Ohio-2,783,819	Mich.-2,258,812
Ind. – 1,410,315	Wis. – 1,217,711
Ill. – 2,895,722	

West No. Central
4,838,672 (9.4%)

Minn. – 1,040,856	S.D.- 211,043
Iowa – 902,927	Neb.-455,289
Mo. – 1,336,999	Kan.-701,841
N.D. – 189,717	

South Atlantic
6,708,844 (13.1%)

Del. – 117,607	N.C. & S.C.- 1,886,667
Md. & D.C.- 962,086	Ga. – 1,009,085
Va. – 979,466	Fla. – 1,191,617
W. Va. – 562,316	

East So. Central
3,175,338 (6.2%)

Ky. – 818,480
Tenn.- 981,963
Ala. – 830,538
Miss.- 544,357

West So. Central
4,687,451 (9.2%)

Ark. – 531,092
La. – 822,119
Okla. – 738,847
Tex. – 2,595,393

Mountain
1,759,746 (3.4%)

Mont.- 205,766	N.M.- 202,236
Idaho- 209,975	Ariz.- 257,499
Wyo. – 102,078	Utah- 222,674
Colo.- 488,020	Nev. – 71,498

Pacific
5,862,474 (11.4%)

Wash. – 872,164
Ore. – 563,942
Calif. – 4,426,368

Total U.S. – 51,214,559

Source: Edison Electric Institute, percent of total U.S. given after regional total

Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	Feb.	103.74	103.62	92.46	12.2
Peak—Class I Systems, million kw	Feb.	83.9	84.1	74.9	12.0
Estimated Dec. '55 Peak	Jan.	95.7	95.9	96.8	−1.1
Production—billion kwhr	Feb.	40.23	43.96	35.21	14.3
hydro		8.57	9.43	8.56	0.1
fuel		31.66	34.53	26.65	18.8
Sales—billion kwhr	Dec.	35.25	33.87	32.31	9.3
residential		11.15	10.07	9.77	14.0
commercial		6.22	6.14	5.60	8.5
industrial		15.57	15.38	14.83	6.8
other		2.30	2.29	2.12	7.5
Fuel Consumption	Feb.				
coal—million tons		11.09	12.02	9.07	22.3
oil—million barrels		7.43	8.91	5.70	30.4
gas—billion cu ft		63.63	65.13	75.74	−16.0
Net Income Class A & B Co's—$ million	Dec.	109.05	94.91	100.86	8.1

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	Mar.	137	135	126	8.7
ENR Construction Cost	Mar.	135.4	135.1	128.7	5.2
BLS Cost of Living	Feb.	114.3	114.3	115.0	−0.6
NEMA Sales	Feb.				
insulation materials		137	132	120	14.2
electric appliances		118	118	98	20.4
household refrigerators		94	96	91	3.3
Wholesale prices	Feb.				
motors and generators		121.2	121.6	124.3	−2.5
transformers and regulators		127.8	128.1	128.1	−0.2
switchgear and fuses		135.4	135.3	135.1	0.2
GNP—annual rate—$ billion	4th Qtr.	362.0	355.5	360.5	0.4

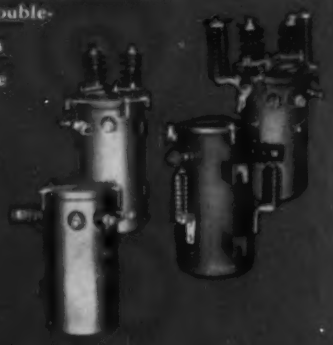
THE BEST POLES HAVE THEM

MOLONEY ELECTRIC

HIPERCORE TRANSFORMERS

Today's distribution systems require more and more transformers. In areas where air-conditioning is widely used, a transformer for every pole is becoming the planned rule.

The best poles have Moloney HiperCore Transformers to insure continuous, dependable operation of this new system. Because HiperCore Transformers are famed for long, trouble-free operating records ... meriting the phrase ... Dependability at its Best. MESD-14



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Power Transformers • Distribution Transformers • Step Voltage Regulators • Regulating Transformers • Load Tap Changing Transformers • Load Center Transformers • Unit Substations • Network Transformers • Constant Current Transformers • Capacitors • Transformers For Electronics

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Make Present Wire

Carry twice the load!

Here's How:

Most lines have extra copper to take care of voltage drop. You can use it to carry more load if you let Allis-Chalmers distribution regulators control voltage automatically.

When load is doubled, voltage drop doubles, too. That's where the ± 10% range of Allis-Chalmers distribution regulators comes in. For example, on a line with 10% voltage drop, doubling the load makes voltage drop 20%. With an A-C voltage regulator you bring the voltage drop back to 10%.

Low-cost Allis-Chalmers distribution regulators mean small capital expenditure. And close voltage control provides higher revenue, few voltage complaints.

A-C distribution regulators are ideal for service like this. They provide quality regulation at low cost . . . are easy to install, simple to operate. Get complete facts from your A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

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